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Poster Session 1

Diagnosis | Pathogenesis

P1.01 Acute angle closure glaucoma after major surgery: a case series
Marta Correia, Mariana Portela, Margarida Baptista, Maria Patricio *(Portugal)*

P1.02 The Manchester Triage System in the acute primary angle closure attack
Margarida Ribeiro, João Barbosa-Breda, Ana Faria-Pereira, Francisco Gonçalves, Flávio Alves, Sérgio Silva, Fernando Falcão-Reis, Antonio Melo *(Portugal)*

P1.03 Acute angle closure glaucoma within "normal" IOP. A case of PISK
Carolina Rius Tornes, Teresa Florit Pons, Marc Rosell Raventos, Celia Fuste Fusares *(Italy)*

P1.04 Tramadol subcutaneous injection inducing simultaneous bilateral acute angle-closure glaucoma
Nada Sakli, Mbarek Sameh *(Tunisia)*

P1.05 Secondary angle closure glaucoma secondary to 360 degrees DALK-iris adherences by AS-OCT imaging
Nikistratos Yfantis, Julia Fajardo Sanchez, Lauren Van Lancker, Jia Ng, Emma Hollick, Lana Fu, Avi Kulkarni *(United Kingdom)*

P1.06 Risk factors for suprachoroidal hemorrhage associated with glaucoma surgery in children: a case-control study
Rakan Algorinees[1], Rizwan Malik[1,2] *([1]Saudi Arabia, [2]Canada)*

P1.07 Myopic tilted disc by optical coherence tomography. Myopic or glaucoma optical neuropathy?
Svetlana Zhukova, Tatiana Iureva *(Russian Federation)*

P1.08 Stress-Strain Index (SSI): an index to take into account in thick CCT patients
Miguel Teus Guezala, Marta I. Martinez-Sanchez, Gema Bolivar, Javier Paz-Moreno-Arrones *(Spain)*

P1.09 Study on the prediction of glaucoma progression in patients associated with sleep apnea using artificial intelligence tools
Nicoleta Anton, Bogdan Doroftei, Catalin Lisa, Camelia Bogdanici, Roxana Ciuntu *(Romania)*

P1.10 Relationship between foveal avascular zone and macular vessel density with central visual field in glaucoma patients
Laura Díez-Álvarez, Laia Jaumandreu, Fernando José Huelin Alcubierre, Cristina Ye Ye Zhu, Ana Diaz Montealegre, Elisa González Pastor, Gema Rebolleda, Francisco José Muñoz Negrete *(Spain)*

P1.11 False-positive classification and associated factor in segmented macular layers and retinal nerve fiber layer analysis: a spectralis OCT deviation map study
Yun Jeong Lee, Jin Wook Jeoung *(South Korea)*

P1.12 Neurofilament light chain - a new marker for neuronal decay in the aqueous humor of glaucoma patients
Nora Woltsche[1], Katharina Valentin[1], Lukas Hoeflechner[1], Andreas Guttmann[1], Jutta Horwath-Winter[1], Mona Schneider[1], Domagoj Ivastinovic[1], Marlene Lindner[1], Leopold Schmetterer[2], Neena Singh[3], Regina Riedl[1], Arabella Buchmann[1], Michael Khalil[1], Ewald Lindner[1] *([1]Austria, [2]Singapore, [3]USA)*

P1.13 Myopic normative database assessment of the retinal nerve fiber layer thickness using spectralis OCT
Hayati Yilmaz, Yagmur Seda Yesiltas, Emre Aydemir, Gözde Aksoy, Gülce Gökgöz Özısık, Mehmet Talay Koylu, Ismail Çagatay Çaglar, Atilla Bayer *(Turkey)*

P1.14 Pupillography measurements in patients with asymmetric glaucomatous damage and their correlations with structural and functional glaucoma parameters
Banu Bozkurt, Yalçın Karaküçük, AyÐe Bozkurt Oflaz, Sona Gorchuyeva *(Turkey)*

P1.15 Glaucoma: is it though?
Alexandra Trivli, Evangelia Dalieraki, Eleni Giakoumogiannaki, Ilias Vasilaras *(Greece)*

P1.16 Developing the intra-ocular pressure metrology in Europe
Dominik Pražák[1], Šejla Ališic[2], Anatolii Bescupschii[3], Alen Bošnjakovic[2], Serghei Ceapa[3], Ehlimana Jugo[2], Vanco Kacarski[4], Nenad Petrovski[4], Václav Sedlák[1], Alina Sincarenco[3], Bianka Stoilkovska[4], Vítezslav Suchý[1], Radovan Wiecek[1] *([1]Czech Republic, [2]Bosnia and Herzegovina, [3]Macedonia)*

P1.17 Glaucomatocyclitic crisis "Posner-Schlossman Syndrome": a case report
Brenda Alegría García Loza, Rodrigo Mateos Oropeza *(Mexico)*

P1.18 Coexistence of normal tension glaucoma and pigment dispersion syndrome manifestations in a female patient. Case report and literature overview
Elpida Kollia[1], Alexandros Chatzirallis[2], Theodora Gianni[2], Konstantina Koumoutsou[2], Diafa Aspasia[2], Eleni Patsea[2] *([1]United Kingdom, [2]Greece)*

P1.19 Automated segmentation of retinal nerve fiber layer excluding retinal blood vessels: integrating OCT and OCT angiography
Valentina Folegani[1], Matteo Airaldi[1], Jonathan Oakley[2], Sara Bochicchio[1], Angelica Dipinto[1], Simona Prandoni[1], Giovanni Staurenghi[1], Giacinto Triolo[1] *([1]Italy, [2]USA)*

P1.20 Automatic goniophotography as a learning tool for gonioscopy
Chiara Pizzorno, Carlo Alberto Cutolo, Alessandro Bagnis, Michele Iester, Carlo Traverso *(Italy)*

P1.21 Automated digital gonioscopy in a real world clinical setting
Sundeep Deol, Andrew Tatham *(United Kingdom)*

P1.22 Influence of altitudinal visual field analysis on reproducibility of visual field sensitivity in glaucoma
Daisuke Shiba, Sayaka Adachi, Akiko Hanyuda, Motohiro Moriya, Kenya Yuki[1] Kazuno Negishi *(Japan)*

P1.23 OCT angiography images evaluation in healthy and glaucomatous subjects using a new data analysis program: inter-image variability
Paola Cassottana, Costanza Iester, Lorenzo Ferro Desideri, Carlo Traverso, Michele Iester *(Italy)*

P1.24 Comparison of intraocular pressure, central corneal thickness and ocular biomechanical metrics using Corvis ST, Goldmann applanation tonometer and ultrasound pachymeter in healthy and ocular hypertensive patients
Elena Ávila Marrón, Maria Del Mar Schilt Catafal, Elena Milla, Susana Duch *(Spain)*

P1.25 Clinical comparison between Swedish Interactive Thresholding Algorithm (SITA) Faster 24-2C and SITA Standard 24-2 in glaucomatous patients
Luca Di Cello, Daniele Sindaco, Federica Tessitore, Giulia Agosto, Carlo Alberto Cutolo, Aldo Vagge, Carlo Traverso, Michele Iester *(Italy)*

P1.26 Quantification and functional correlations of macular microvasculature in the ganglion cell-inner plexiform layer in primary open angle glaucoma using OCT angiography
Ingy Ingymadi *(USA)*

P1.27 Clinical usefulness of layer-by-layer deviation maps of spectralis OCT: comparison with cirrus OCT
Sooyeon Choe, Mirinae Jang, Young Kook Kim, Ki Ho Park, Jin Wook Jeoung *(South Korea)*

P1.28 Optical coherence angiography of optic disc in eyes with primary open-angle glaucoma and normal-tension glaucoma with equal levels of structural damage
Ioannis Halkiadakis, Spiros Atzamoglou, Nikos Koukos, Vasilis Tzimis, Michalis Tzakos *(Greece)*

P1.29 Catch trials in advanced glaucoma: general glaucoma or macular program
Dragan Janjic *(Serbia)*

P1.30 Retinal nerve fiber layer defect on optical coherence tomography en face image is more closely related with visual field indices than conventional red-free fundus photography
Hyuk Jin Choi, Jin-soo Kim *(South Korea)*

P1.31 Diagnostic accuracy and relationship between optical coherence tomography angiography vessel density and structural/functional parameters in healthy, preperimetric and manifest glaucoma eyes
Asma Khallouli, Yassin Weslati, Dhouha Gouider, Afef Maalej, Riadh Rannen *(Tunisia)*

P1.32 Long-term outcomes of standalone excisional goniotomy using the Kahook Dual Blade in eyes with primary open-angle glaucoma
Theresa Landry, Mohammed Kamal Elmallah, Blake Williamson, Cade Nelson *(USA)*

P1.33 Evaluation of the diagnostic accuracy of different tomographic parameters by SD-OCT in preperimetric and perimetric stage of glaucoma
Afef Maalej, Yassin Weslati, Dhouha Gouider, Asma Khallouli, Riadh Rannen *(Tunisia)*

P1.34 Correlation between parameters of Bruch's membrane opening, retinal nerve fiber layer and ganglion cell complex
Maria Liseth Salazar Quiñones, Carmen Mendez-Hernandez, Julian Garcia Feijoo, Rafael Sánchez del Hoyo *(Spain)*

P1.35 Reproducibility of optic nerve head and macular vessel density by Heidelberg Spectralis II optical coherence tomography angiography (OCT-A) in glaucoma and healthy subjects
Maria Liseth Salazar Quiñones, Jose Ignacio Fernandez-Vigo, Pilar Peña-Urbina, Jose Martinez-de-la-Casa, Julian Garcia Feijoo *(Spain)*

P1.36 Contrast sensitivity in glaucoma patients with visual field defects in different locations
Jiyong Jang, Eun Ji Lee *(South Korea)*

P1.37 OCT (RNFL, GCC) findings in glaucoma clinic patients with normal visual field tests: how to approach and treat
Chrysanthos-Christos Laoudikos, Chryssa Terzidou, Vassilios Kozobolis *(Greece)*

P1.38 Evaluation of ganglion cell parameters and comparison with retinal nerve fiber layer in preperimetric glaucoma, early stage glaucoma and healthy people
Özlem Aktas Özaltun, Özlem Gürbüz Köz *(Turkey)*

P1.39 Structure-function correlation between OCT and both Visual Field SITA Standard and SITA Faster
Federica Tessitore, Daniele Sindaco, Giulia Agosto, Martina Mercuri, Carlo Alberto Cutolo, Carlo Traverso, Michele Iester *(Italy)*

P1.40 Differentiating chiasmal macroadenoma from primary open angle glaucoma by optical coherence tomography
Seyda Ugurlu, Turan Akbalık, Gonca Oruk *(Turkey)*

P1.41 Association between retinal vascular parameters and retinal nerve fiber layer thickness in open angle glaucoma: the ALIENOR population-based study
Catherine Helmer, Melanie Le Goff, Marie-Noelle Delyfer, Marie-Benedicte Rougier, Jean-François Korobelnik, Audrey Cougnard-Gregoire, Cecile Delcourt, Cédric Schweitzer *(France)*

P1.42 Eclectic risk factors for ocular hypertension and glaucoma patients in the Iberian Peninsula
Maria Dolores Pinazo Duran, Jose Miguel Bolarin-Guillen, Carolina Garcia Villanueva, Jose Javier Garcia-Medina, Jose Manuel Salgado-Borges, Helena Cristina Campos-Borges, Juan Francisco Ramos-Lopez, Elena Rodriguez-Neila, Elena Bendala-Tufanisco, Vicente Zanón-Moreno *(Spain)*

P1.43 A case of idiopathic iridoschisis
Massimo Savastano *(Italy)*

P1.44 Microspherophakia in Weill-Marchesani syndrome, the ophthalmologist should not be missed
Kulawan Rojananuangnit *(Thailand)*

P1.45 Complications after dexamethasone intravitreal implant in diabetic macular edema patients
Almudena Moreno Martínez, Cristina Blanco Marchite, Francisco López Martínez, Antonio Donate Tercero, Carlos Cava Valenciano, Eva Gonzalez Aquino, Sergio Copete Piqueras *(Spain)*

P1.46 Optic disc structural and functional assessment in patients with primary Raynaud's phenomenon
Ana Rita Carreira, Nadine Marques, Pedro Carreira, Filipe Moraes, Tomas Loureiro, Sandra Rodrigues-Barros, Paula Saldanha, João Cardoso, Nuno Campos *(Portugal)*

P1.47 OCT in optic disc drusen: what do we have to look at?
Laura Sánchez Vela, Marta Garrido Marín, Alejandro Pardo Aranda, Rafael Fischer, Olivia Pujol Carreras, Manuel Antonio Amilburu Pérez, Jaume Rigo, Antoni Dou, Marta Castany *(Spain)*

P1.48 Bilateral choroidal detachment in the absence of previous intraocular surgery: a case series
Maria Jesus Chaves Samaniego *(Spain)*

P1.49 The relationship between cerebrovascular autoregulation and retrobulbar blood flow in glaucoma patients
Evelina Simiene, Akvile Stoškuviene, Lina Šiaudvytyte, Ingrida Januleviciene *(Lithuania)*

P1.50 Structure-function analysis of the peripapillary intrachoroidal cavitation
Artemise Dugauquier, Wilfried Tchatchou Tomy, Nacima Kisma, Kevin Coppens, Yassir Alaoui Mhammedi, Karelle Leroy, Francoise Bremer, Adele Ehongo Bidime *(Belgium)*

P1.51 Protein kinase C regulates hypoxia-induced effects on NMDAR-mediated excitatory retinocollicular neurotransmission in the in vitro model of central retinal projections
Hanna Dumanska, Nickolai Veselovsky *(Ukraine)*

P1.52 ELAVL1/HuR is required for both endo- and exogenous neuroprotection in retinal ganglion cells
Anna Pacwa[1,2], Joanna Machowicz[1], Piotr Rodak[1], Bartosz Machna[1], Saeed Akhtar[2], Marita Pietrucha-Dutczak[1], Marialaura Amadio[3], Joanna Lewin-Kowalik[1,2], Adrian Smedowski[1,2] *([1]Poland, [2]Saudi Arabia, [3]Italy)*

P1.53 Role of the integrated stress response in glaucoma
Caoimhe Normile, Mustapha Irnaten, David Simpson, Oisín Cappa, Boris Kholodenko, Vadim Zhernovkov, Colm O'Brien *(Ireland)*

P1.54 Ultrastructural visualization of lymphatic vessels of filtration blebs after non-penetrating glaucoma surgery
Tatiana Iureva, Yulia Malisheva *(Russian Federation)*

P1.55 Reduced mitochondrial DNA copy number in peripheral blood lymphocytes of POAG patients
Antoni Vallbona Garcia, Ilse Hamers, Florence van Tienen, Irenaeus de Coo, Carroll Webers, Hubert Smeets, Theo Gorgels *(The Netherlands)*

P1.56 Unusual extreme seasonal intraocular pressure (IOP) fluctuation in primary open-angle glaucoma (POAG)
Dimitra Oikonomou, Petko Hristov, Aggeliki Androu, Antonios Manolakis, Dimitrios Alonistiotis *(Greece)*

P1.57 The effect of miR-29b expression on ADAM12 & ADAM19 in the lamina cribrosa in primary open angle glaucoma
Aoife Smyth, Breedge Callaghan, Darrell Andrews, Mustapha Irnaten, Colin Willoughy, Colm O'Brien *(Ireland)*

P1.58 Resolution of hypotony related peripapillary retinoschisis in a glaucoma patient with normalization of intraocular pressure
Ioannis Markopoulos, Ioannis Halkiadakis, Anna Vernikou, Michalis Tzakos *(Greece)*

P1.59 Generation of human retinal ganglion cells for glaucoma disease modeling
Theo Gorgels, Iris Boesten, Florence van Tienen, Hubert Smeets, Carroll Webers, Birke Benedikter *(The Netherlands)*

P1.60 Changes in blood flows in the central retinal artery secondary to IOP reduction in open angle glaucoma measured by Holographic Doppler
Régis Lecoge, Michael Atlan, Léo Puyo, Emmanuelle Brasnu-De Cenival, Luzu Jade, Michel Paques, Christophe Baudouin, Labbé Antoine *(France)*

P1.61 The role of AMP-related kinase 5 (ARK 5) inhibition in human glaucomatous lamina cribrosa cells
Sarah Powell[1], Breedge Callaghan[2], Mustapha Irnaten[1], Colin Willoughy[2], Colm O'Brien[1] *([1]Ireland, [2]United kingdom)*

P1.62 Primary open-angle glaucoma patients have reduced systemic mitochondrial function compared to healthy controls
Bledi Petriti, Kai-Yin Chau, Alessandro Rabiolo, Gerassimos Lascaratos, David Garway-Heath *(United Kingdom)*

P1.63 Autotaxin in the lamina cribrosa: a driver of fibrosis in glaucoma
Amy O'Regan, Sarah Eivers, Mustapha Irnaten, Deborah Wallace, Colm O'Brien *(Ireland)*

P1.64 Paired analysis of mitochondrial DNA variants in primary open angle glaucoma: the role of somatically acquired mutations
Neeru Vallabh, Brian Lane, David Simpson, Marc Fuchs, Anshoo Choudhary, Colin Willoughy *(United Kingdom)*

P1.65 A connection between serum levels of HSP 70 and parameters of structural and functional glaucoma damage
Marija Trenkic, Predrag Jovanovic, Jasmina Djordjevic-Jocic, Marija Radenkovic, Maja Petrovic *(Serbia)*

P1.66 Pseudophakic pupillary block
Pablo Cisneros, Ismael Bakkali El Bakkali, Eva Josefina Núñez Moscarda, Juan Ibañez *(Spain)*

P1.67 Neovascular glaucoma due to ocular ischemia syndrome. Case report and differential diagnosis
Elizabeth Salcedo, Gloria Biarge, Beatriz Rodriguez, Barbara Delas Alos, Mouafk Asaad *(Spain)*

P1.68 Secondary intraocular hypertension due to increased episcleral venous pressure – different etiologies and pathophysiological mechanisms
Margarida Baptista, Marta Correia, Mariana Portela, Maria Picoto, Pedro Arede *(Portugal)*

P1.69 Regulation of lysyl oxidase-like protein 1 by microRNAs in pseudoexfoliation glaucoma
Alka Khera, Surinder Pandav, Faisal TT, Jagat Ram *(India)*

P1.70 Optic nerve head changes in eyes treated with multiple intravitreal injections
João Garrido, Inês Passos, Diogo Fortunato, Olga Berens, Augusto Candeias *(Portugal)*

P1.71 Comparison of machine learning approaches for focal visual field modelling
Damon Wong[1,2], Jacqueline Chua[1], Inna Bujor[3], Alina Popa-Cherecheanu[3,4], Leopold Schmetterer[1,2,5]
([1]Singapore, [2]Switzerland, [3]Romania, [4]Romania, [5]Austria)

P1.72 The discriminative ability of two glaucoma diagnostic calculators in glaucoma suspects and glaucoma patients
Nestor Ventura Abreu, Marc Biarnés, Sofía Batlle, Maria Teresa Carrión Donderis, Rafael Castro Domínguez, Javier Moreno Montañes, Marta Pazos *(Spain)*

P1.73 Reversible mitochondrial injury in dying retinal ganglion cells
Wenting You, Chris Reutelingsperger, Tos Berendschot, Carroll Webers, Theo Gorgels *(The Netherlands)*

P1.74 Intraocular pressure changes during yoga exercises in young healthy adults
Darja Shajiei, Josephine Wachtl, Angelika Schuknecht, Lucas Bachmann, Christoph Kniestedt *(Switzerland)*

P1.75 Increased risk of Alzheimer's disease in patients with normal tension glaucoma: a nationwide cohort study
Yu Yen Chen[1,2], Man Chen Hung[1] *([1]Taiwan, [2]USA)*

P1.76 Association between retinitis pigmentosa and an increased risk of open angle glaucoma
Man Chen Hung[1], Yu Yen Chen[1,2] *([1]Taiwan, [2]USA)*

P1.01
Acute angle closure glaucoma after major surgery: a case series

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Purpose: Acute angle-closure glaucoma (AACG) is a rare complication following major surgery that can have a poor prognosis. Few articles, mostly single-case studies, report this complication and no predictive scores are available nor preventive measures described. In our clinic, we encountered three cases of this rare condition.

Methods: We reviewed a series of three clinical cases of AACG following cardiovascular or abdominal surgery that were referred to our clinic between January 2020 and December 2021. From consulting the medical records, data as demographical factors, hospitalization evolution, administered drugs, perioperative complications and ophthalmologic examination were collected.

Results: We report three cases of 70- to 80-year-old female patients that were submitted to one of the following surgeries: mechanical aortic valve replacement, coronary angioplasty with stent placement, and cholecystectomy. All procedures occurred uneventfully. Between the first- and fourth-day post-surgery they began experiencing symptoms of nausea, headache, periorbital pain and unilateral vision loss. They were referred to the ophthalmologic emergency service where they presented with high intraocular pressure of the affected eye (values between 52-64 mmHg), visual acuity (VA) of hand motion or less, corneal edema, fixed or sluggish mid-dilated pupil and shallow anterior chamber. Treatment with topical hypotensors, corticosteroids and pilocarpine along with oral acetazolamide and intravenous mannitol was promptly initiated and a therapeutic laser iridotomy was performed in all cases with success, followed by prophylactic laser iridotomy in the unaffected eye. After adequate IOP management and reduction of topical medication, recovery of initial VA and regression of all symptoms were observed. One patient is phakic and is awaiting lens extraction.

Conclusion: Despite being a rare complication of surgery and general anesthesia, AACG can have devastating consequences. Apart from individual risk factors, mydriasis caused by anesthetics at higher than clinical concentrations, postoperative care in a dark room, stress and use of both parasympatholytic and sympathomimetic drugs increase the probability of anterior chamber angle closure. As symptoms such as headache, nausea and vomiting may be mistaken for postoperative symptoms and consequently dismissed, a strong clinical suspicion by non-ophthalmologists is of outmost importance for early diagnosis and prompt treatment of this condition.

P1.02
The Manchester Triage System in the acute primary angle closure attack

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Purpose: To describe the cases of acute primary angle closure (APAC) attack diagnosed in the Emergency Department (ED), correlating initial complaint with the Manchester triage level and ultimately the timing until ophthalmological evaluation and iridotomy.

Methods: This cross-sectional observational study analyzed the episodes of APAC attack attended at the Ophthalmology ED in our tertiary center from January 2010 until December 2020. Initially, 2228 ED episodes labelled with the diagnoses glaucoma or ocular hypertension were obtained, followed by systematic screening of each episode for correct identification of a true APAC attack. A final number of 120 episodes of 120 patients was obtained. Clinical data was gathered, including Manchester triage level, presenting complaint, intraocular pressure (IOP) at presentation, first medical specialty that observed the patient, time until observation by Ophthalmology and time until laser iridotomy.

Results: Among the 120 patients, 84 (70%) were female and mean age was 68 ± 12 years. Mean IOP at admission was 53.4 ± 12.4 mmHg. 9.2% of patients presented only non-ocular complaints, while other 9.2% presented mixed complaints (ocular and non-ocular). Most patients (68.1%) with only non-ocular or mixed complaints were triaged to a non-Ophthalmologist ($p < 0.001$). Concerning the triage system, at admission, most patients (66.7%) were attributed a yellow level (urgent), while 9.2% and none were labelled as orange (very urgent) or red (emergent), respectively. Most patients (83.3%) were directly sent to Ophthalmology (properly triaged), while the remaining were incorrectly assigned to a non-Ophthalmologist. Median time until observation by Ophthalmology was 49 minutes in the properly triaged group (min. 15, max. 404), while it was 288 minutes (minimum 45, maximum 871) in those who were incorrectly triaged ($p < 0.001$). Likewise, median time until treatment with laser iridotomy was 203 minutes in the properly triaged group (min. 22, max. 1440) and 353 minutes in the incorrectly triaged group (min. 112, max. 947) ($p < 0.001$).

Conclusion: Proper treatment of patients with an APAC attack had a significant delay if they were first assigned to non ophthalmologists. There is a need to raise awareness regarding the presenting signs and symptoms of an APAC attack in order to avoid preventable vision loss.

P1.03
Acute angle closure glaucoma within "normal" IOP. A case of PISK

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Purpose: To report a case of pressure-induced stromal keratopathy (PISK) masquerading an acute angle closure in a patient who had previous laser in situ keratomileusis (LASIK) surgery.

Methods: A 61-year-old female presented painful blurred vision in her right eye 15 years after LASIK surgery in both eyes. This was associated with diffused corneal edema, anterior chamber angle closure and a pocket of fluid in the interface LASIK wound. The intraocular pressure (IOP) measured by Goldman applanation tonometry was 15 mmHg, whereas when measured with Icare method was 47 mmHg. Nd: yag iridotomies were performed in both eyes and the patient was treated with antiglaucomatous and corticosteroid drops.

Results: 24 hours later the visual acuity had improved and the IOP was 4 mmHg. However, ten days later the IOP increased to 43 mmHg. The patient underwent cataract surgery on her right eye and one month after the surgery, the problem was completely resolved.

Conclusion: In this particular case, PISK is secondary to ocular hypertension caused by an acute angle closure glaucoma. The pocket of fluid in the interface LASIK wound may alter intraocular pressure measurements and may mislead us in the diagnosis. PISK can occur many years after LASIK surgery and, to the best of our knowledge, this is the first reported case of delayed PISK secondary to acute angle closure glaucoma.

P1.04
Tramadol subcutaneous injection inducing simultaneous bilateral acute angle-closure glaucoma

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Purpose: To report a case of acute attack of primary angle-closure glaucoma secondary to subcutaneous administration of TRAMADIS.

Methods: We report the case of a 50-year-old patient, hospitalised in the orthopedic surgery department for a surgical procedure requiring tramadol subcutenaous injection,2 hours later he presented with bilateral painful red eyes and decrease bilateral visual acuity associated with nausea and vomitting.

Results: The ophtalmic examination showed bilateral diffuse conjunctival hyperaemia with a perikeratic circle, an areflectic semi-mydriasis pupil, major hypertonia and a narrow anterior chamber. The examination of the iridocorneal angle showed a closed angle thus confirming the diagnosis of an acute angle closure glaucoma (ACG). The bilateral presentation of the ACG attack led us to suspect an iatrogenic cause especially due to a tramadol injection 2 before the start of symptoms. The patient was treated with topical anti-glaucoma therapy and intravenous Mannitol 20% injection.After resolution of ocular hypertension, NdYag laser peripheral iridotomy was performed on both eyes. Visual acuity improved to 20/20 in both eyes after 7 days follow-up and intraocular pressure returned to normal levels.

Conclusion: This case highlights the risk of developing bilateral acute angle-closure glaucoma after Tramadol administration.

P1.05
Secondary angle closure glaucoma secondary to 360 degrees DALK-iris adherences by AS-OCT imaging

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Purpose: Complex anterior segment surgery complications such as acute angle closure glaucoma remain a challenge for the glaucoma-cornea unit. Progressive adherences between a donor graft and the pupillary margin leading to this have not been previously described. AS-OCT imaging is key to identify and safely deliver a subspecialty management on time.

Methods: Report of a case. A 58-year-old male with a previous diagnosis of bilateral keratoconus with reduced visual acuity in the left eye presented with severe corneal scarring and mild nuclear sclerotic cataract. Given the impossibility of obtaining an accurate biometry, it was decided to perform a DALK prior to cataract extraction. 24 hours post-surgery, the eye showed a flat cornea with a shallow anterior chamber and oedema at the graft-host junction that impeded aqueous outflow. IOP was 55. He progressively developed adhesions for almost 360 degrees between the pupil margin and the periphery of the host tissue, which were confirmed by the AS-OCT imaging.

Results: The left eye was treated with maximum topical treatment (latanoprost, timolol, dorzolamide, apraclonidine) and oral acetazolamide 250mg three times daily. Progressively, his IOP reduced and at this moment is well controlled on dorzolamide 2%/ timolol 0.5% twice daily. Future management will include cataract surgery with goniosynechialysis and anterior segment revision with lysis of irido-graft adhesions.

Conclusion: Angle closure glaucoma secondary to oedema of the DALK graft-iris junction with the subsequent development of iridocorneal adhesions have not been reported previously. Solid medical management and continuous examining by both anterior segment specialties is a preventive step towards severe optic nerve damage and an essential step before a surgical approach. Imaging of the anterior segment using AS-OCT software remains as a major confirmation tool as well as a monitoring device.

P1.06
Risk factors for suprachoroidal hemorrhage associated with glaucoma surgery in children: a case-control study

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Purpose: To assess the risk factors of suprachoroidal hemorrhage (SCH) following glaucoma surgery in pediatric patients in a tertiary eye center.

Methods: A retrospective case-control study of 326 eyes of 326 pediatric patients (< 18 years of age) who underwent glaucoma

surgery between January, 2014 till September, 2017. A total number of 17 cases (children with SCH) were compared with 309 controls who underwent glaucoma surgery in the same period uneventfully.

Results: Out of 17 cases of SCH, one had occurred intraoperatively; the reminder occurred in the early postoperative period. The most frequent diagnosis was primary congenital glaucoma (PCG), accounting for 11 patients (64.7%) in cases and 247 patients (79.9%) in controls, followed by glaucoma associated with non-acquired ocular anomalies which accounted for 4 cases (23.5%) and 22 controls patients (7.1%). We included age, gender, baseline IOP, glaucoma diagnosis, previous pars plana vitrectomy, preoperative axial length, pachymetry, lens status and type of glaucoma surgery performed (whether combined or standalone). Aphakia (p = 0.001) and combined surgery (p = 0.004) were found to be risk factors to develop SCH on univariate analysis, with preoperative IOP coming close (p = 0.097), However; only combined surgery reached high level of statistical significance (p = 0.03) in the multivariate analysis.

Conclusion: Combined surgery has shown to be the strongest risk factor for SCH in our study. This may prompt surgeons to avoid combining surgeries whenever clinically possible. Aphakia may also be a risk factor identified in our univariate analysis and reported by several others.

P1.07
Myopic tilted disc by optical coherence tomography. Myopic or glaucoma optical neuropathy?

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Purpose: To evaluate optic nerve head (ONH) and peripapillary retina changes in patients with high myopia and tilted discs by optical coherence tomography (OCT)

Methods: The medical records of 24 eyes from 36 patients with myopic tilted disc were reviewed. All patients underwent OCT and OCT-angiography imaging.

Results: All 24 eyes were highly myopic with axis length 27.42 ± 2.53 mm. Characteristic changes in ONH and peripapillary retina were: posterior displacement of the lamina cribrosa, size and shape increase of Bruch's membrane, peripapillary retina elevation from the nasal side, peripapillary scleral deformation, peripapillary lower-temporal atrophy, lower-temporal wedge-shaped RNFL defects of the ONH and corresponding hypoperfusion sectors of the radial peripapillary plexus. Perforating cilioretinal vessels along the edge of the ONH and intrachoroidal cavitation were detected in 6 eyes. The revealed changes were not glaucomatous. Inconsistency of RNFL and ONH changes is observed - in the presence of RNFL defects, there were no changes in the neuroretinal rim.

Conclusion: The diagnostic capacities of RNFL should be interpreted with caution in myopic eyes with tilted optic discs. When the peripapillary sclera is deformed in patients with high myopia and tilted discs, a strong bending of the RNFL and a blood flow violation are formed. This may be the reason for the formation of structural and functional defects as a result of axonal flow disorder.

P1.08
Stress-Strain Index (SSI): an index to take into account in thick CCT patients

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Purpose: To compare the Goldmann applanation tonometry (GAT) and the Corvis IOP measurements in two populations with normal but thick central corneal thickness (CCT).

Methods: 17 eyes with untreated OHT (controls) and a group of patients with congenital aniridia and their relatives (20 eyes) without any corneal pathology (study group) were analyzed. The CCT (ultrasound), Corvis and GAT measurements were performed.

Results: CCT was 583.46 ± 22.3 vs 586.05 ± 52.0 microns in control vs study eyes (p = 0.8). The GAT IOP and the bIOP values were 24.7 ± 5.02 and 20.2 ± 5.4 in the control eyes (p = 0.0001) and they were 15.4 ± 2.03 and 15.5 ± 2.3 in the study group (p = 0.8). The SSI index was significantly lower in the controls than in OHT eyes (p = 0.002)

Conclusion: A thick CCT does not necessarily mean that GAT will overestimate the IOP. GAT IOP seems to be accurate in congenital aniridia patients and relatives, despite having a thick CCT. The SSI seems to provide a reliable evaluation of the corneal rigidity

P1.09
Study on the prediction of glaucoma progression in patients associated with sleep apnea using artificial intelligence tools

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Purpose: To construct neural models to predict the progression of glaucoma in patients with sleep apnea.

Methods: Modeling using neural networks was performed using the commercial simulator Neurosolutions. The databases built contain information on a group of patients with primitive open-angle glaucoma and normal-tension glaucoma, who have been associated with sleep apnea syndrome in various stages of severity. The data that make up the database were divided as follows: 65 were used in the neural network training stage and 8 were kept for the validation stage. 21 parameters were selected as input parameters for neural models, including: age, BMI, systolic and diastolic blood pressure, intraocular pressure, central corneal thickness, corneal biomechanical parameters (IOPcc, HC, CRF), AHI, desaturation index, Nocturnal oxygen saturation, remaining AHI, type of apnea. The selected output parameters are: c / d ratio, modified visual field parameters (MD, PSD), ganglion cell layer thickness. Forward-propagating neural models (Multilayer Perceptron) have been constructed with a layer of hidden neurons. The most important step in modeling with artificial neural networks is the validation step in which the input data consists of the data set that was not used in the drive step. The constructed neural models generated the output values for this data. The results obtained were then compared with the experimental values. The performance of the neural models

was evaluated by calculating the mean square error (MSE), the correlation coefficient (r2) and the percentage error (Ep).

Results: The best results were obtained in both the training and the validation phase with the RNA network (21: 35: 4). In the validation stage, if we consider a 25% confidence interval, we find that very good results are obtained, except for the average GCL thickness, for which the errors are slightly higher

Conclusion: The neural models used have shown the possibility of their use in predicting the progression of glaucoma in patients associated with sleep apnea. Very good results have been obtained in the validation phase, which support the results obtained in other studies in the literature that strengthen the connection between sleep apnea syndrome and glaucoma change

P1.10
Relationship between foveal avascular zone and macular vessel density with central visual field in glaucoma patients

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Purpose: To investigate the relationship between foveal avascular zone (FAZ) parameters and macular vessel density (VD) assessed by optical coherence tomography angiography (OCTA) with central visual field by using Humphrey Field Analyzer (HFA) Swedish Interactive Threshold Algorithm-Faster (SITA-faster) 24-2 and 24-2C test grids in glaucoma patients.

Methods: FAZ parameters and macular VD were measured by using OCTA (AngioVue RTVue XR Avanti, Optovue). Relationship between vascular parameters and central visual field mean sensitivity (VFMS) (global, superior and inferior hemifields) tested on 24-2 and 24-2C grids were analyzed by Pearson correlation coefficient. The comparison between correlation coefficients was performed by Steiger test.

Results: Transversal study involving 31 eyes with glaucoma from 27 patients. No significant correlation was found between FAZ area or FAZ perimetry and central VFMS (0.035, p = 0.851 and 0.029, p = 0.876). Instead, lower foveal vessel density (FD300) was associated with worse central VFMS in 24-2 and 24-2C grids (0.481, p = 0.006 and 0.476, p = 0.007, respectively). Significant correlations between macular VD and mean sensitivity in the 10º central of the VF were found both with 24-2 and 24-2C test grids: VFMS24 vs whole VD (0.662, p < 0.001) and VFMS24-2C vs whole VD (0.632, p < 0.001), VFMS24 vs parafoveal VD (0.713, p < 0.001) and VFMS24-2C vs parafoveal VD (0.699 p < 0.001), VFMS24 vs perifoveal VD (0.633, p < 0.001) and VFMS24-2C vs perifoveal VD (0.603, p < 0.001). Worse superior hemi-VFMS 24-2 and 24-2C was associated with lower inferior hemimacular VD (0.658, p < 0.001 and 0.615 p < 0.001, respectively). Moreover, worse inferior hemi-VFMS 24-2 and 24-2C was associated with lower superior hemimacular VD (0.570, p = 0.001 and 0.577 p = 0.001, respectively). No significant differences were detected between correlations with 24-2 and 24-2C test grids.

Conclusion: Worse 10º central VFMS was correlated with lower macular VD both with 24-2 and 24-2C test grids. The FD300, but not the FAZ area or FAZ perimetry, was correlated with central VFMS.

P1.11
alse-positive classification and associated factor in segmented macular layers and retinal nerve fiber layer analysis: a spectralis OCT deviation map study

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Purpose: To determine the rate and associated factors for false-positive classification of segmented macular layers (ganglion cell layer (GCL), inner-plexiform layer (IPL), retinal layer) and retinal nerve fiber layer (RNFL) deviation maps of Spectralis optical coherence tomography (OCT), and to figure out false-positive patterns on macular layers deviation maps.

Methods: This retrospective, cross-sectional study included a total of 118 healthy eyes from 92 normal participants who underwent Spectralis OCT imaging with Glaucoma Module Premium Edition software. False-positive classification was determined by the area and length of the abnormal color-coded regions on deviation map. The rates of false-positive segmented macular layers and RNFL deviation maps were analyzed and associated factors were determined using univariate and multivariate logistic regression analyses. False-positive patterns on segmented macular layers deviation maps were classified according to the shape and area of the abnormal color-coded regions.

Results: The false-positive rate was the highest in GCL map (57 (48.3%) eyes), followed by IPL (46 (39.0%) eyes), retinal layer (28 (23.7%) eyes), and RNFL map (18 (15.3%) eyes). On multivariate analysis, smaller refractive error was the only factor that was significantly associated with higher false-positive classification on deviation map of RNFL (OR, 0.82; 95% CI, 0.70–0.96; P = 0.01). Three characteristic false-positive patterns of island, hook, and donut shape were found on segmented macular layers deviation maps, among which the island shape was the most common in all layers, followed by hook shape and donut shape.

Conclusion: Considering the rates and patterns of false-positives, care should be taken when interpreting the Spectralis OCT deviation map to avoid false-positive classification, especially in eyes with smaller refractive error for RNFL deviation map analysis.

P1.12
Neurofilament light chain - a new marker for neuronal decay in the aqueous humor of glaucoma patients

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Purpose: Neurofilament light chain (NfL) levels in cerebrospinal fluid and serum are reliable indicators for neuroaxonal damage in a broad spectrum of neurodegenerative diseases. Herein, we investigate NfL levels in serum and aqueous humor of glaucoma patients.

Methods: Patients scheduled for routine glaucoma or cataract surgery were recruited for this study. Retinal nerve fiber layer thickness was measured by optical coherence tomography (OCT, Heidelberg Spectralis®). NfL levels in serum and in aqueous humor were analyzed with Simoa SR-X Analyzer (Quanterix; NF-LIGHT®, Lexington, MA, USA). T-test was used for parametric data and Mann-Whitney-U test for nonparametric data. Spearman's rank-order correlation was used to investigate correlations. p-values < 0.05 were considered as statistically significant.

Results: Serum NfL concentration of glaucoma patients was similar to serum NfL concentration in controls (median (interquartile range); 22.7 (18.9) pg/ml versus 22.5 (24.0) pg/ml; p = 0.763). A positive correlation of serum NfL with age was observed in both glaucoma patients (r = 0.77; p < 0.001) and in the control group (r = 0.82, p < 0.001). In the aqueous humor the NfL concentration was substantially increased in glaucoma patients compared to controls (20.7 (101.3) pg/ml versus 3.1 (2.9) pg/ml; p < 0.001). Furthermore, we found a positive correlation of aqueous humor NfL with preoperative intraocular pressure (r = 0.39, p = 0.003) and with retinal nerve fiber layer thickness (r = 0.58, p < 0.001).

Conclusion: NfL levels in aqueous humor are elevated in glaucoma patients and correlate with intraocular pressure and retinal nerve fiber layer thickness. We suggest aqueous humor NfL as a new marker for neuronal decay in glaucoma patients.

P1.13
Myopic normative database assessment of the retinal nerve fiber layer thickness using spectralis OCT

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Purpose: To evaluate the peripapillary retinal nerve fiber layer (pRNFL) color probability codes based on a generated myopic normative database in comparison with the built-in normative database.

Methods: In this cross-sectional validity study, a total of 451 subjects (101 controls and 154 mild, 105 moderate, and 91 high myopia cases) were included. The associations of the pRNFL thickness with spherical equivalent and axial length were investigated. A myopic normative database was created for each group. The distribution of the color probability codes among the groups based on the built-in and myopic normative databases were investigated along with the agreement of the abnormal color code frequency between these two normative databases.

Results: In myopic eyes, the pRNFL of the temporal sector was significantly thicker (p < 0.001) and that of the remaining sectors, except nasal, was significantly lower (p = 0.340 for the nasal sector and < 0.001 for the remaining sectors). The agreement between the databases was very good only for the control group (kappa > 0.8). The agreement was decreased with the increasing myopia degree. The distribution of the color codes of the built-in software significantly differed between the study groups in all sectors (p = 0.011 for the temporal sector and p < 0.001 for the remaining sectors). When the myopic database was used, there were no longer significant differences between the groups for the temporosuperior, temporoinferior, temporal and nasal sectors (p = 0.550, 0.313, 0.142, and 0.076, respectively).

Conclusion: With the myopic normative database, the distribution of the abnormal codes among the groups becomes more similar. Therefore, while the use of this database would provide more reliable results in the evaluation of myopic eyes for glaucoma. While distinguishing the glaucoma damage from the changes due to myopia further studies were needed to demonstrate the validity of the myopic normative database, that's why we currently gathering myopic glaucoma patients to establish the sensitivity and specificity of the myopic normative database in detecting glaucomatous defects.

P1.14
Pupillography measurements in patients with asymmetric glaucomatous damage and their correlations with structural and functional glaucoma parameters

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Purpose: To determine if there is any inter-eye differences in pupil diameters in patients with asymmetric glaucomatous damage and evaluate the correlation of Humphrey visual field (VF) parameters, optic disc cup to disc (C/D) ratio and retinal nerve fiber layer thickness (RNFLT) measurements (Spectralis OCT, Heidelberg Engineering, Germany) with the pupil measurements in scotopic (0.04 lux), mesopic (4 lux) and photopic (50 lux) conditions taken in dynamic mode with the integrated pupillary module of CSO Sirius Topographer device (CSO, Italy).

Methods: Twenty patients with exfoliation glaucoma (EG), 10 patients with primary open-angle glaucoma (POAG) and 3 patients with pigmentary glaucoma with asymmetric glaucomatous damage were included in the study. The intereye differences in VF parameters, C/D ratios, RNFLT and pupil diameters (PD) were compared using paired sample-t test or Wilcoxon Signed rank test and their correlations were evaluated using Pearson or Spearman correlation tests and a p value < 0.05 was considered as statistically significant.

Results: Thirty-three patients (21 men, 12 women) with a mean age of 60.15 ± 9.05 years were included in the analysis. Mean C/D ratio, MD, PSD, VFI and RNFLT in the worse eyes (0.89 ± 0.12,-16.38 ± 10.26, 6.77 ± 3.69, 59.05 ± 33.06 and 52.52 ± 11.78 mm, respectively) were significantly different than the better eyes (0.43 ± 0.18, -4.1 ± 3.87, 3.3 ± 2.62, 94.25 ± 6.3 and 90.94 ± 11.03 mm, respectively) (p < 0.05, all). Scotopic, mesopic and photopic PD did not differ between the worse (4.33, 3.84 and 3.25 mm, respectively) and better eyes (4.39, 3.87 and 3.18, respectively) (p > 0.05, all). No correlations were found between PD and C/D, VF and RNFLT parameters (p > 0.05, all), while C/D ratio showed a high correlation with MD (r = -0.66), PSD (r = 0.72), VFI (r = -0.66) and RNFLT (r = -0.83).

Conclusion: Using Sirius pupillography, no inter-eye differences in PD in scotopic, mesopic and photopic conditions could be found in patients with asymmetric glaucomatous damage.

P1.15
Glaucoma: is it though?

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Purpose: To present three cases misdiagnosed as glaucoma.

Methods: Three patients proceeding for second opinion, with diagnosed POAG, with IOp = 11-15 mmHg under PGs for over 3 years were suspected to not have glaucoma based on optic nerve appearance. PGs were stopped for two months and maximum diurnal IOP variation was ≤ 3 mmHg and maximum IOP <20 mmHg. All patients had CCT values ≥ 541 μm with no family history of glaucoma.
Case 1. 65 yo male, with no signs of glaucomatous optic neuropathy (GON) OD and pale optic nerve OS, incompatible with GON. Visual acuity OS was CF with severely depressed VF and OCT compatible with total optic nerve atrophy.
Case 2. 29 yo female, myopic with -2.50 sph OU, with no signs of PDS, 10/10 visual acuity. VF showed mild blind spot enlargement OU, confirming the clinical diagnosis of tilted disks, while OCT parameters were unreliable (red disease).
Case 3. 50 yo female, with normal fundoscopic optic nerve appearance OU, was evaluated with VF and OCT in order to exclude GON and right homonymous inferior quadrantanopia (pie on the floor) was revealed.

Results: All cases had no GON risk factors. In case 1, unilateral severe optic atrophy with unclear history, led to a suspected diagnosis of a previous ischemic optic nerve event. In case 2, fundoscopic view of tilted disks, corresponded with VF findings. In case 3, VF findings confirmed reported frequent headaches by the patient, who was referred for an MRI.

Conclusion: Careful assessment of history, thorough confirmation of high IOP or IOP spikes and evaluation of GON risk factors is essential. Optic nerve appearance, OCT and VF findings should be complementary and show agreement in structure and function. If that is not the case, diagnosis should be questioned and patients should be re-evaluated.

P1.16
Developing the intra-ocular pressure metrology in Europe

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Purpose: The screening of the intra-ocular hypertension is an important task of the public health services. All the eye-tonometers in service must be periodically checked for their metrological correctness which is required by the law (e.g. in Czechia and Germany) or by the quality systems. These checks must ensure a metrological traceability to the national standards and/or to the clinical tests. The complexity of the problems concerning the intra-ocular pressure metrology forced several national metrology institutes (NMIs) of Europe to cooperate.

Methods: The first common initiative of the NMIs of Central Europe and Turkey was the EMPIR Programme Project inTENSE which ran from 2017 to 2020. A centre of excellence for the intra-ocular metrology was founded at the Czech Metrology Institute with the help of the German experts. This centre is now able to provide the metrological traceability and the trainings to the other European NMIs. In connection to this a smart specialisation concept was developed to enable other NMIs to participate in this metrology segment. Moreover, the other results of this project will be presented, including a novel intra-ocular pressure transfer-standard and the results of a unique interlaboratory comparison for this quantity.

Results: The smart specialisation concept proved to be inspiring also for another medical metrology initiative, a sphygmomanometry related project adOSSIG which runs from 2019 to 2022. But within the intraocular-pressure metrology, the concept will be further extended by the follow-up EMPIR Programme Project CEFTON focused on the Central Europe Free Trade Agreement (CEFTA) countries which runs from 2021 to 2023. Its interim results will also be presented.

Conclusion: The fruitful cooperation of the European NMIs helped to establish the calibration, training and research capabilities for the intra-ocular pressure metrology and to maintain and develop them in the future.

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P1.17
Glaucomatocyclitic crisis "Posner-Schlossman Syndrome": a case report

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Purpose: Posner- Schlossman Syndrome (PSS), is a rare disease, more prevalent in men between 20 and 50 years old, characterized by a unilateral ocular nongranulomatous anterior uveitis with raised intraocular pressure in presence of an open angle that can result in chronic secondary glaucoma.

Methods: Clinical case of a 21-year-old male presented to the glaucoma consultant with a complaint of blurred vision and halos in his right eye, with anterior uveitis, an intraocular pressure (IOP) of 41 mmHg, an open angle (Shaffer grade IV). He had a history of two previous similar attacks, seven years ago. In the fundus examination the papilla evidenced cup-to-disc ratio 0.7 right eye (oculus dexter, OD) and cup-to-cup disc ratio 0.4 in left eye (oculus sinister, OS). The starting medication was with ophthalmic drops brimonidine 0.2%/ Dorzolamide 2%/ Timolol 0.5% along with 750 mg of oral acetazolamide. After 7 days, the patient attended the follow-up consult with significant lowering of the IOP, OD was 10 mmHg and OI 12 mmHg. Significant laboratory findings: Anti-CMV IgG positive, Anti HLA-B27 positive. Rheumatoid factor and C reactive protein within the high-normal parameters; Treatment continued with suspension of acetazolamide and beginning of topical steroid. In the two-week follow-up consult the patient maintained target IOP in the OD 9 mmHg and OI 11 mmHg.

Results: PSS has a good response to ocular hypotensive and anti-inflammatory treatment during attacks and could add to the criteria for diagnosis, presenting intraocular pressure control, as well as remission of pain, and even retro keratic precipitates; Finally consider that topical corticosteroids and ocular hypotensive medications are sufficient to control these attacks, but not to

prevent recurrences.

Conclusion: Most patients treated for attacks recover without long-term sequelae. However some others with repeated attacks develop structural glaucomatous damage to the GCC and RNFL, as well as functional damage evident in their visual fields. Early recognition and control of the attacks represent the visual prognosis, hence the importance of extended follow-up to monitor the evolution.

P1.18
Coexistence of normal tension glaucoma and pigment dispersion syndrome manifestations in a female patient. Case report and literature overview

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Purpose: To describe a case of a female patient presenting simultaneous Normal Tension Glaucoma and Pigment Dispersion Syndrome.

Methods: A 57-year- old myopic woman was admitted to the Glaucoma Unit for a routine check-up due to family history of glaucoma. Upon admission the best corrected visual acuity was: OD 10/10cc (-2.50 sph) OS 10/10cc (-3.00 sph). The slit lamp examination revealed bilateral Krukenberg's spindle, peripheral iris transillumination defects and mild nuclear cataract. The intraocular pressure was 16 mmHg and 12 mmHg, while the central corneal thickness was 521 μm and 517 μm respectively. The highest intraocular pressure ever reported was lower than 20 mmHg bilaterally. The gonioscopy revealed open angles with heavy pigmentation of the trabecular meshwork. The fundus examination after pupil dilation showed bilateral optic disc cupping (C/D 0.7 OD, C/D 0.6 OS) with inferior notching and concomitant flame shaped hemorrhage of the inferior pole OU. There was also evident Zentmayer line in both eyes. Regarding her medical history, she is experiencing symptoms of Raynaud's syndrome and arterial hypotension.

Results: The patient underwent Humphrey Visual Field 30-2 and Optical Coherence Tomography scans which presented significant abnormalities associated with glaucoma. Hence, once daily dosing of latanoprost was commenced. The intraocular pressure has decreased and remained stable in all consecutive follow-ups.

Conclusion: Findings of several glaucomatous entities may coexist in the same patient.

P1.19
Automated segmentation of retinal nerve fiber layer excluding retinal blood vessels: integrating OCT and OCT angiography

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Purpose: Large peripapillary blood vessels (PBVs) and capillaries (PCs) are currently segmented within the retinal nerve fiber layer (RNFL) in commercially available OCT segmentation software, contributing to automated calculation of RNFL thickness (std-RNFLT). In this cross-sectional clinical study we developed a fully automated segmentation algorithm capable of subtracting PBVs and PCs from RNFLT using OCT Angiography (OCT-A) scans of the optic nerve head (ONH), and we compared PBV-free and PBV+PC-free RNFLT to std-RNFLT in order to evaluate the impact of peripapillary vessles on RNFLT.

Methods: ONH scans of 26 healthy eyes, 26 glaucoma suspects, and 16 glaucomatous eyes were analyzed. After convolutional neural network-based RNFL and disc margin segmentation, an en face OCT-A image of the RNFL plexus was generated, enhanced and thresholded. Assuming vessels' tubularity, PBV ans PC thickness in the axial direction was extrapolated from vessel pixels distance to the nearest non-vessel pixel. PBV and PC thickness was then subtracted from the std-RNFLT map to obtain PBV-free and PBV+PC-free RNFLT. Differences between groups were analyzed with t-test and analysis of variance (ANOVA). The influence of covariates was analyzed by a linear mixed-effects model (GLMM).

Results: In healthy eyes, PBV-free RNFLT was significantly reduced in the superior and inferior sectors compared to std-RNFLT (6.6% and 8.1% reduction, respectively, $p < 0.01$), while PBV+PC-free RNFLT was significantly reduced in all sectors but the temporal (6.8-11.9% reduction range, $p < 0.001$). In glaucoma suspects and glaucomatous eyes, PBV-free RNFLT was not significantly different compared to std-RNFLT (apart from average values ($p < 0.05$)), while PBV+PC-free RNFLT was significantly reduced in all sectors but the temporal (7.7-13% and 10.8-15.2% reduction range for glaucoma suspects and glaucoma, respectively, all $p < 0.001$). GLMM showed no association of age, axial length and keratometry values with the difference among std-, PBV-free, and PBV+PC-free RNFLT.

Conclusion: PBVs and PCs account for a significant percentage of the RNFLT, if measured by commercially available OCT segmentation software. Our fully automated deep learning-based segmentation software excluding PBVs and PCs, provides more accurate estimates of RNFLT, possibly improving OCT ability to detect early neural damage due to glaucoma.

P1.20
Automatic goniophotography as a learning tool for gonioscopy

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Purpose: To evaluate the role of anterior chamber angle (ACA) pictures obtained with automatic gonioscopy (Gonioscope GS-1, NIDEK Co., Ltd.) to support the learning of gonioscopy.

Methods: 30 true-colour 360-degree gonioscopic pictures presenting different ACA findings were extracted from a large dataset. Six first-year residents in ophthalmology were asked to grade each image describing three features: angle status (open or closed), apparent iris insertion (Spaeth's classification) and pigmentation of the trabecular meshwork (TM). Two glaucomatous specialists determined the ground truth. Cohen's Kappa coefficient was calculated to determine the agreement between each examiner and the ground truth before and after a training course. During the 2-hour training course, other 360-degree gonioscopic pictures were presented and described.

Results: Before the training session, the mean (± sd) kappa values were 0.21 ± 0.16, 0.05 ± 0.11 and 0.07 ± 0.07 for the angle opening, the iris insertion and the TM pigmentation, respectively. After the training, we observed a significant increase in the average kappa values that changed to 0.44 ± 0.09 for the angle opening ($p = 0.07$), to 0.45 ± 0.04 for the iris insertion ($p < 0.01$) and to 0.39 ± 0.05 for the TM pigmentation ($p < 0.01$). An improvement in identifying abnormal ACA features, such as peripheral anterior synechiae or previous filtering surgeries, was observed.

Conclusions: The overall agreement improved from poor to moderate. Our results indicate that GS-1 has a significant role in teaching and assessing the gonioscopic skills of ophthalmologists in training.

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P1.21
Automated digital gonioscopy in a real world clinical setting

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Purpose: Gonioscopy plays an essential role in recognizing glaucoma subtype [1, 2] whilst contact lens gonioscopy for anterior-chamber-angle (ACA) evaluation is recognised to have poor reproducibility aswell as technically challenging for clinicians [3]. Here we present the feasibility of ACA digital imaging in a real world clinical setting.

Methods: New and follow up patients attending an NHS tertiary referral centre, Edinburgh, were invited to have color imaging of their irido-corneal angles using GS-1 Nidek automated gonioscope camera [4]. The patients' comfort and clinician ease of use was determined with a Likert scale.

Results: 21 patients underwent traditional gonisocopy (zeiss 4-mirror lens) and automated gonioscopy with GS-1 Nidek camera of both eyes. 8 of 21 patients preferred automated gonioscopy, while 9 were equivocal. 100% of patients graded the comfort of automated gonioscopy between "very comfortable" and "comfortable". Ease of use by the clinician was variable, with 16/42 deemed "difficult".

Conclusion: Automated gonioscopy of the iridocorneal angle in a busy outpatient setting of a NHS tertiary hospital is a valuable asset for clinical grading and digital record for future reviews. Our study confirms patients have no objection to the GS-1 camera compared to traditional gonioscopy methods, but may require further iterations to improve ease of use for clinicians during imaging acquisition.

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P1.22
Influence of altitudinal visual field analysis on reproducibility of visual field sensitivity in glaucoma

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Purpose: A method to precisely quantify visual field (VF) defects is useful in detecting progression in glaucomatous optic neuropathy. Global averaging of VF threshold or deviation commonly employed to minimize fluctuations in each test point like mean deviation (MD) and pattern standard deviation values. Since defect progression in the superior and inferior hemifileds often occur independently of each other in glaucoma, discrete evaluation of each altitudinal hemifield may be more effective at detecting glaucoma progression compared to global averaging. The objective of this study was to investigate the influence of altitudinal VF analysis on the reproducibility of visual filed sensitivity (VFS) with standard automated primetry (SAP).

Methods: We recruited 51 primary open angle glaucoma patients with VF defects above 18 dB of MD value at Keio University Hospital, Tokyo. Eyes with cataracts or any other ocular diseases except glaucoma or history of intraocular surgery except successful glaucoma surgery were excluded. The SAPs by Humphry filed analyzer with a central 30-2 program were repeatedly measured at twice over two months. As perimetric measures, we calculated the mean values of the VFS in the whole field, the superior hemifield, and the inferior hemifield. Intraclass correlation coefficient (ICC) between two inter-visit measurements was used as an index of reproducibility.

Results: Among 51 eyes of 51 glaucoma patients, the mean (± SD) MD value was -5.2 ± 4.7 dB. ICC (95% confidence interval [CI]) of VFS in the whole, superior hemifield, and inferior hemifiled measurements were 0.93 (0.89 0.96), 0.95 (0.91 0.97) and 0.95 (0.92 0.97), respectively.

Conclusion: The reproducibility of the VFS metrics in the discrete hemifiled was comparable to that in the whole filed, suggesting that altitudinal VF analysis may be a reliable proxy for detecting glaucoma progression.

P1.23
OCT angiography images evaluation in healthy and glaucomatous subjects using a new data analysis program: inter-image variability

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Purpose: Although the pathogenic role of vascular dysregulation in glaucoma is widely recognized[1], only a few studies focused on the implementation of a computerized analysis system to evaluate the optic disc perfusion to identify ocular microvascular defects[2]. The purpose of the present study is to investigate the reproducibility of macular and papillary microvasculature measurements in normal and glaucomatous subjects by Swept-Source optical coherence tomography angiography (OCT-A).

Methods: 5 glaucomatous and 5 healthy eyes were analyzed by using Swept-Source (Topcon, DRI OCT Triton) OCT-A device. A set of 3 OCT-A images of the optic disc and macula were acquired for each subject. Macular vessel densities were measured in the Superficial, Deep, Outer Retina, and Choriocapillaris layers. Papillary and peripapillary vascularization was measured in the Nerve head, Vitreous, Radial Peripapillary Capillaries (RPC), and Choroid/Disc layers. A total of 24 scans for each eye was examined by a new program obtained with Matlab. The distribution of the different level of gray was calculated in each scan. The partition of x-values into bins was produced by a Matlab function (histcounts) which also returns the number of pixels for each bin. The mean, standard deviation, and coefficient of variation (CoV) of all measurements were calculated.

Results: In glaucomatous eyes, the CoV ranged from 12.4% to 25.01%, while in the control group ranged from 5.76% to 22.74%. In both glaucoma and healthy subjects, the worst CoVs were found when macula was assessed. The ONH layers obtained the best CoV both for healthy and glaucomatous eyes (5.76% and 12.78%, respectively), while the worst CoV was for choroid, deep, and choriocapillaris layers. When we considered the analyses for each level of gray analyzed, a CoV < 10% was obtained in 70% of the glaucomatous eyes for the Nerve Head, 73% for the Choroid/Disc, 64.7% for the Vitreous, and 71.6% for the RPC. In healthy eyes, the best CoV was 90,9% for Nerve Head, 86.2 for RPC, and 71.3% for Vitreous.

Conclusion: The less inter-image variability was found in the 130 µm superficial papillary area, which includes Nerve Head, Vitreous, and RPC. A better reproducibility was obtained in healthy subjects.

P1.24
Comparison of intraocular pressure, central corneal thickness and ocular biomechanical metrics using Corvis ST, Goldmann applanation tonometer and ultrasound pachymeter in healthy and ocular hypertensive patients

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Purpose: To compare in controls and ocular hypertensive (OHT) patients intraocular pressure (IOP) and central corneal thickness (CCT) values obtained with Corvis ST (CST), a new non-contact tonometer, Goldmann applanation tonometer (GAT) and ultrasound pachymetry (USP). Besides to contrast corneal biomechanical parameters (CBP) measured with CST in each group.

Methods: In this observational study 45 controls and 47 OHT patients were enrolled. Non corrected IOP (ncIOP), biomechanical corrected IOP (bIOP), GAT-IOP and CCT were measured with CST, GAT and USP in a random order. On the other hand, CBP included first and second applanation length (A1L, A2L) and velocity (A1V, A2V), highest concavity peak distance (HCD), highest concavity radius (HCR) and deformation amplitude (DA).

Results: In controls GAT-IOP was 16.8 ± 3 mmHg, ncIOP was 16.3 ± 2.8 mmHg and bIOP was 14.7 ± 2.2 mmHg, whereas, in OHT group GAT-IOP was 24.3 ± 3.4 mmHg, ncIOP was 23.9 ± 4.4 mmHg and bIOP was 20.7 ± 4.2 mmHg. CST pachymetry and USP were 563 ± 35 µm and 564 ± 34 µm each in controls, whilst CCT was 581 ± 40 µm and 569 ± 40 µm with CST and USP respectively in OHT group. In healthy patients A1L and A1V were 2.20 ± 0.32 mm and 0.13 ± 0.25 m/s respectively, A2L and A2V were 2.12 ± 0.46 mm and -0.24 ± 0.03 m/s. HCD, HCR and DA were 4.872 ± 0.29 mm, 7.674 ± 1.0 mm and 1.031 ± 0.96 mm in that order. In OHT A1L and A1V were 2.48 ± 0.22 mm and 0.103 ± 0.14 m/s each. A2L was 2.380 ± 0.41 mm, A2V was - 0.17 ± 0.03 m/s, HCD was 4.242 ± 0.44 mm, HCR was 7.726, ± 0.88 mm and DA was 0.839 ± 0.08 mm.

Conclusion: Regarding IOP, GAT-IOP was significantly higher than bIOP (p = 0) in both groups. About CCT there was significant difference between CST and USP (p = 0) in OHT patients presenting thicker corneas. Moreover, in controls was observed lower A1L and A2L but higher VA1 and DA suggesting that they might have more deformable corneas than OHT group.

P1.25
Clinical comparison between Swedish Interactive Thresholding Algorithm (SITA) Faster 24-2C and SITA Standard 24-2 in glaucomatous patients

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Purpose: The aim of this study is to evaluate the difference in sensitivity between Humphrey visual field using the 24-2 Swedish interactive thresholding algorithm (SITA) Standard (SS) and 24-2C SITA Faster (SFR-C) in glaucomatous patients.

Methods: One-hundred-three eyes of open-angle glaucoma patients (mean age 74.4 ± 16.6 years) were included in this retrospective observational study. The overall mean value of Mean Deviation (MD), pattern standard deviation (PSD), and the Visual Field Index (VFI) were compared, furthermore a pointwise analysis for all the 52 points of each visual field was performed to detect the difference of sensitivity. The 10 central points of SFR-C were excluded from the analysis. We also performed a sub-group analysis by subdividing glaucomatous eyes in 3 groups regarding MD value: MD> -6dB (1), -6dB<MD>-12dB (2), MD< -12dB (3).

Results: 24-2 SITA Standard and 24-2C SITA Faster sensitivity was overall superimposable. The sensitivity was higher in (SFR-C) than in SS. MD (-9,25 vs -9,26), PSD (7,28 vs 7,15) and VFI (73,73 vs 75,11) showed no significant difference between the two algorithms, while in the pointwise analysis there was a significant difference of the mean sensibility value (MSV) in 11 points between SFR-C and SS ($p < 0.05$). In all the point (SFR-C) sensitivity was higher than SS. In sub-group analysis, we found 19 points of significant difference of MSV in group (1), 7 points in group (2) and 3 points in group (3), even in the subgroup analysis (SFR-C) had a higher sensitivity than SS.

Conclusion: Although SFR-C provides benefits in test time and shows similar VFI, MD and PSD value compared with SS, pointwise analysis highlighted differences in MSV. These are more evident and statistically significant difference ($p < 0.05$) in early-stage glaucoma group.

P1.26
Quantification and functional correlations of macular microvasculature in the ganglion cell-inner plexiform layer in primary open angle glaucoma using OCT angiography

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Purpose: To quantify the microvasculature changes in the macula in primary open angle glaucoma patients as measured from optical coherence tomography angiography en face images of the ganglion cell-inner plexiform layer; and to determine the strength of correlation of perfusion with hemifield mean deviation values.

Methods: 6x6 mmscans of the macula were obtained on POAG and normal patients using the Angioplex SD-OCTA, and Humphrey Visual Field 24-2 mean deviation (MD) defects were calculated for superior and inferior hemifields in each eye using proprietary formulas (Carl Zeiss Meditech; Dublin, CA). Prototype software was used: (1) to perform segmentation of the raw OCTA data to obtain a precise (GC-IPL) en face image, (2) to calculate perfusion parameters including vessel area density (VAD), vessel skeleton density (VSD), and vessel complexity index (VCI) for the macula (globally, hemifields, and focal sectors) (Fig. 1). Perfusion parameters in normal and glaucomatous eyes were compared using Wilcoxon rank sum test. Strength of correlation between each perfusion parameter and the corresponding hemifield MD values were calculated using Spearman's rank correlation.

Results: The study included 20 POAG eyes (12 mild/moderate and 8 severe) and 16 normal eyes. 6 eyes showed no visual field defects, 7 eyes had superior VF defects only, 2 eyes had inferior VF defects only, and 5 eyes had both. VAD, VSD, and VCI were significantly reduced with worsening severity of glaucoma (VAD $p = 0.0047$; VCI $p = 0.0016$; $p =$ VSD 0.0023 using Kruskal- Wallis test). Glaucomatous eyes had significantly reduced perfusion parameters compared to normal eyes. There was a strong correlation between inferior HVF mean deviation and superior VAD ($p = 0.0018$), VSD ($p = 0.000061$), VCI ($p = 0.000098$) as well as globally (Fig. 2).

Conclusion: Glaucomatous eyes with a range of no to severe visual field defects showed significant reduction in macular perfusion parameters as compared to normal eyes. There was a strong correlation of degree of perfusion impairment with degree of corresponding visual field defects in hemifields. This method will prove useful in the future for diagnosis, staging and monitoring of glaucoma.

This abstract has been accepted as a paper session presentation at ARVO.

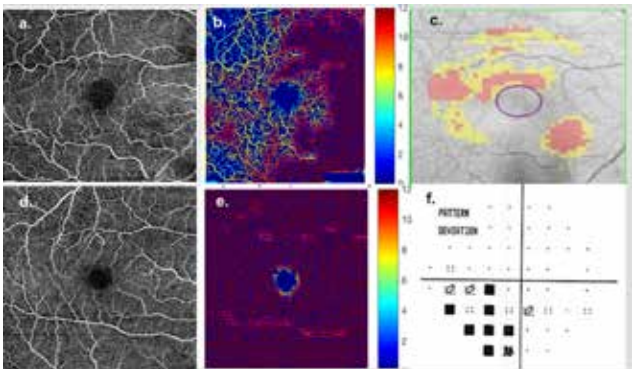

Figure 1. a) 6 x 6 mm² en face images pf macula after semi-automatic segmentation of ganglion cell-inner plexiform layer of representative glaucoma parient; b) vessel complexiti map showing attenuated microvasculature in the temporal macula; c) GC-IPL thickness deviation map from OCT; d) 6 x 6 mm en face images of macula of a healthy normal patiente; e) vessel complexity map showing normal microvasculature; f) visula field shows inferior nasal step wich correlates with superotemporal perfusion defect

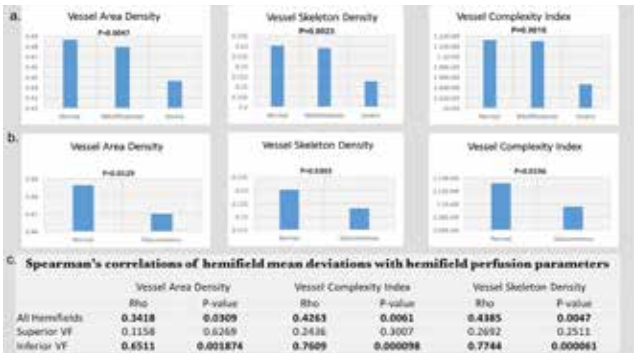

Figure 2. Comparison of mean vessel area density, vessel complexity index and vessel skeleton density at different glaucoma stages.

P1.27
Clinical usefulness of layer-by-layer deviation maps of spectralis OCT: comparison with cirrus OCT

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Purpose: Spectralis (Heidelberg Engineering, Heidelberg, Germany) and Cirrus (Carl Zeiss Meditec, Dublin, CA, USA) OCT are commonly used spectral domain (SD) -optical coherence tomography (OCT) for measuring key parameters to assess glaucoma. While deviation maps of Cirrus OCT have long been used as a tool for assessment of glaucomatous eyes in clinical settings, deviation maps of Spectralis OCT have only recently become available. The aim of this study is to compare the diagnostic abilities of Spectralis and Cirrus OCT for retinal nerve fiber layer (RNFL) defect detection among preperimetric glaucoma (PPG) and early glaucoma (EG) patients.

Methods: In this cross-sectional and observational study, a total of 144 eyes (47 healthy, 43 PPG, 54 EG [MD ≥ -6 dB]) of 144 participants underwent Spectralis and Cirrus OCT on the same day. The presence of RNFL defect on red-free RNFL photography and the respective deviation maps of Spectralis and Cirrus OCT was rated. Areas under the receiver operating characteristic curves (AUCs), sensitivities and specificities were analyzed using McNemar test for each deviation layer for discrimination of healthy eyes from PPG and EG eyes.

Results: The RNFL, ganglion cell layer (GCL), and retinal layers of Spectralis OCT and the RNFL and macular ganglion cell-inner plexiform layer (GCIPL) of Cirrus OCT showed high diagnostic performance (all AUCs > 0.8) in discriminating PPG and EG eyes from healthy eyes. Among them, RNFL layer of Cirrus OCT had the largest AUC (0.84 for PPG, 0.96 for EG), but showed no statistical differences from RNFL and retinal layers. The inner plexiform layer (IPL) of Spectralis OCT had the smallest AUC (0.56 for PPG, 0.80 for EG). Discrepancies between the results of Spectralis and Cirrus OCT were shown in 12 cases. Of them, seven showed RNFL defects according to Spectralis OCT and negative results by Cirrus; the other five cases showed the opposite results.

Conclusion: The Spectralis and Cirrus OCT deviation maps showed good diagnostic abilities except for the IPL layer of Spectralis. In the clinical setting, both Spectralis and Cirrus OCT can be useful for detection of RNFL defects in PPG and EG eyes.

P1.28
Optical coherence angiography of optic disc in eyes with primary open-angle glaucoma and normal-tension glaucoma with equal levels of structural damage

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Purpose: To compare visual field (VF), nerve fiber and ganglion cell loss and changes in peripapillary vasculature in age matched patients with normal-tension (NTG) and high tension (primary open angle or pseudoexfoliative) glaucoma at an equal level of glaucomatous structural damage of the optic nerve head (ONH)

Methods: One eye of consecutive patients with NTG and age matched HTG was included in the present study. Optic nerve head parameters, retinal nerve fiber layer (RNFL) ganglion cell (GCC) thickness and vessel densities (VD) in the peripapillary area were measured automatically with available spectral-domain OCT system (RTVue XR OCT Avanti System; Optovue Inc., Fremont, CA) with a respective software. Thirty eyes with NTG, were matched according to the same glaucomatous ONH damage based on cup to disc ratio rim area and disc size with 30 eyes with HTG.

Results: Mean age of patients was 67.9 ± 12 years. Based on the OCT, NTG and HTG displayed comparable structural damage of the ONH (NTG/ HTG: Disc area 1.94 / 1.87 mm^2, p = 0.48; rim area 1.01 / 1.10 mm^2, p = 0.35; C/D 0.45/ 0.42 p = 0.11.) The visual field index, RNFL, GCC thickness and peripapillary VDs in the HTG eyes were similar to those in the NTG eyes (mean VFI 82 vs 78 p = 0.11, mean RNFL thickness 72.11 vs 71.55µm mean GCC thickness 76.37 vs 74.23 µm mean peripapillary VD 38.12 vs 38.14 %). There was no difference in sectoral RNFL thickness and peripapillary VDs between HTG and NTG. In both groups, univariate regression analysis using the Pearson correlation coefficient showed VFI significantly correlated with RNFL thickness (NTG r = 0.489 p = 0.005 HTG r = 0.454 p = 0.015), and peripapillary VD (NTG r = 0.714 p < 0.001 HTG p = 0.461 p = 0.014) in both groups but with GCC thickness (NTG r = 0.52 p = 0.03) only in eyes with NTG.

Conclusion: At an equal level of glaucomatous structural damage of the ONH indicated by cupping, rim area and cup to disk ratio, NTG patients seem to have same losses of peripapillary vasculature. Visual field index correlated with RNFL thickness and peripapillary vessel density in both groups.

P1.29
Catch trials in advanced glaucoma: general glaucoma or macular program

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Purpose: The aim of this study was to compare the values of catch trials and to estimate distribution between false-positive (FP) and false–negative (FN) responses in advanced glaucoma (AG) stage obtained by application of general glaucoma (G1X) and macular program (M2).

Methods: The catch trials with FP and FN responses of 42 eyes in AG stage (20< MD<-12dB), obtained by application of G1X and M2 program (OCTOPUS 123,TOP strategy), have been restrospectively analyzed. Standard deviation calculator has been used in order to estimate the average percentage distrubution of FP and FN responses. Statistical comparison between FP and FN responses, acquired by application of mentioned programs-G1X and M2, has been calculated with T-test (statistical software in Excell).

Results: The following average values of percentage distribution, first in G1X and then in M2 program, were recorded: for FP responses 3.15% // 0.86%, while for FN responses were 47.8% // 28.6%. Owing to T-test results, there was estimated statistcally highly non-significant difference between values of FP on the level p < 0.01 (t = 0.036,p = 0.48) and statistcally significant difference between values of FN on the level p < 0.05 (t = 1.95, p = 0.02) within these two programs.

Conclusion: Keeping in mind the data that the FN responses are rather eye than patient's status, contrary to FP responses, the results of this study strongly nominates the M2 program as a program of choice for visual field examination in AG stage.

P1.30
Retinal nerve fiber layer defect on optical coherence tomography en face image is more closely related with visual field indices than conventional red-free fundus photography

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Purpose: To investigate the retinal nerve fiber layer (RNFL) measurements obtained with red-free fundus photography and optical coherence tomography (OCT) en face image, and compare the strength of the structure–function association.

Methods: Two hundred fifty-six eyes of 256 open-angle glaucoma (OAG) patients with localized RNFL defect on red-free fundus photography were enrolled. A subgroup analysis included 81 highly myopic eyes (< -6.0 diopters). Angular width of RNFL defect was measured and compared in red-free fundus photography (i.e., red-free RNFL defect) and OCT en face image (i.e., en face defect). Pearson correlation coefficients and biases assessed with Bland–Altman analysis were calculated for agreement evaluation. The correlation between angular width of RNFL defect with functional outcomes, reported as mean deviation (MD) and pattern standard deviation (PSD, were assessed with Pearson correlation analysis.

Results: The angular width of red-free RNFL defect and en face defect showed a weak correlation (R^2 = 0.192, p < 0.001), and poor agreement (mean difference 19.98°, 95% limits of agreement 17.91 to 22.05°). The association between the en face defect with MD and PSD was stronger (R^2 = 0.311 and R^2 = 0.372, respectively) than the association between red-free RNFL defect with MD and PSD (R^2 = 0.162 and R^2 = 0.137, respectively) (p < 0.05 for all). In highly myopic eyes, the association between the en face defect with MD and PSD was also stronger (R^2 = 0.503 and R^2 = 0.555, respectively) than the association between red-free RNFL defect with MD and PSD (R^2 = 0.216 and R^2 = 0.166, respectively) (p < 0.05 for all).

Conclusion: En face defect showed a high correlation with visual field indices compared to red-free RNFL defect. The same trend was also observed in highly myopic eyes.

P1.31
Diagnostic accuracy and relationship between optical coherence tomography angiography vessel density and structural/functional parameters in healthy, preperimetric and manifest glaucoma eyes

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Purpose: The purpose of this study was to evaluate circumpapillary vessel density (cpVD) in normal subjects, preperimetric glaucoma, and manifest glaucoma; to assess the relationship between cpVD and both structural and functional parameters, and to compare the diagnostic accuracy of the structural and vascular measurements.

Methods: An analytical cross-sectional study of 153 eyes of 83 individuals, divided into three groups; normal subjects, preperimetric glaucoma, and manifest glaucoma. All subjects underwent standard automated perimetry, spectral-domain optical coherence tomography (OCT), and optical coherence tomography angiography (OCT-A) centered on the optic nerve. We assessed structural (ganglion cell complex (GCC) / retinal nerve fiber layer (RNFL)) and functional parameters (mean deviation (MD) / loss variance (LV)).

Results: Thirty-three normal subjects (66 eyes), 18 patients (30 eyes) with preperimetric glaucoma, and 32 patients (57 eyes) with manifest primary open-angle glaucoma were enrolled. The comparative study of cpVD showed a significant difference comparing glaucomatous subjects versus preperimetric glaucoma groups and normal subjects. The cpVD was strongly correlated with functional parameters, MD, and LV (p < 0.001). Also, cpVD was better correlated with RNFL than GCC. Best regression was observed with mean RNFL (R^2 = 0.752). The cpVD has a higher diagnostic value than RNFL and GCC, only between preperimetric and manifest glaucoma.

Conclusion: Circumpapillary vessel damages seem to be less prominent, as it was seen only for the manifest glaucoma group. Microvascular changes appear to occur secondary to RNFL and GCC damages. They seem to be well correlated with visual function. Therefore, OCT-A is not as sensitive as SD-OCT in detecting early structural alterations.

P1.32
Long-term outcomes of standalone excisional goniotomy using the Kahook Dual Blade in eyes with primary open-angle glaucoma

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Purpose: To describe the long-term safety, intraocular pressure (IOP) lowering effect, and reduced surgical burden of the Kahook Dual Blade® (New World Medical, Rancho Cucamonga, California) as a standalone procedure when used to excise trabecular meshwork in eyes with primary open angle glaucoma (POAG).

Methods: This is a retrospective chart review of 39 eyes from 2 sites in the USA that included data collection of IOP, IOP-lowering medications, and additional glaucoma procedures at months 12, 24, 36, and 48. Eyes were not washed out of their previous IOP-lowering medications for this analysis. Intra- and postoperative adverse events were tabulated.

Results: Analysis from 39 eyes showed a mean IOP reduction from a baseline of 20.4 to 15.0 mmHg at month 48 (26.4% reduction, p < 0.001) Medication use at 48 months was similar to baseline (p = 0.123). 33/39 (85%) eyes required no further surgery to manage IOP. One case of mild iritis related to the procedure was reported.

Conclusion: Excisional goniotomy with KDB effectively decreases IOP over long-term follow up when utilized as a standalone procedure in eyes with POAG. The device also shows a favorable safety profile in line with other minimally invasive glaucoma surgical interventions. Notably, the vast majority of patients (85%) did not require additional surgical intervention to further lower IOP for the duration of the study.

P1.33
Evaluation of the diagnostic accuracy of different tomographic parameters by SD-OCT in preperimetric and perimetric stage of glaucoma

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Purpose: To evaluate and compare the diagnostic value of spectral-domain optical coherence tomography (SD-OCT) parameters (optic nerve head (ONH) / ganglion cell complex (GCC) / retinal nerve fiber layer (RNFL)) at the preperimetric and perimetric primary open-angle glaucoma (POAG).

Methods: A retrospective descriptive and analytical study, involved 275 eyes of 152 Participants underwent reliable standard automated perimetry testing and SD-OCT with ONH mode, RNFL mode and GCC mode. The subjects were divided into 3 groups: 33 healthy subjects (66 eyes), 32 patients (51 eyes) with preperimetric glaucoma (PPG), and 87 patients (158 eyes) with manifest POAG. All subjects underwent a complete bilateral ophthalmologic examination and SD-OCT. The area under the receiver operating characteristic curve (AUC) was calculated to assess the ability of ONH, RNFL and GCC parameters in detecting glaucomatous changes.

Results:
The ONH parameters were the least discriminatory compared to RNFL and GCC, especially when comparing preperimetric and manifest glaucoma groups. Analysis of RNFL and GCC showed a significant difference in all sectors between healthy subjects and PPG groups ($p < 0.001$). The AUC of inferior GCC thickness for PPG and manifest glaucoma was higher than that of mean RNFL compared ($p < 0.001$). All the studied parameters had a good diagnostic value in the manifest glaucoma, especially the average RNFL (AUC = 0.841) and the inferior RNFL thickness (AUC = 0.862; $p < 0.001$). For the diagnosis of the evolution from PPG to a manifest glaucoma, the highest AUC was observed with the superior RNFL thickness (AUC = 0.723; $p < 0.001$).

Conclusion: Macular GCC thickness and RNFL thickness showed better diagnostic performance for POAG detection than the stereometric parameters of the ONH. The assessment of the inferior sectors has the best diagnostic value whether in preperimetric or perimetric stage of glaucoma.

P1.34
Correlation between parameters of Bruch's membrane opening, retinal nerve fiber layer and ganglion cell complex

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Purpose: Correlate parameters of Bruch's membrane opening (BMO), retinal nerve fiber layer (RNFL) and ganglion cell complex (GCC)

Methods: Cross-sectional study evaluated 193 eyes from in 113 subjects including 71 glaucoma patients and 42 healthy subjects. Glaucoma subjects included 64 mild glaucoma, 28 moderate glaucoma and 6 advanced glaucoma. After a complete ophthalmologic examination, was obtained Bruch's membrane opening (BMO), retinal nerve fiber layer (RNFL) and ganglion cell complex (GCC) using OCT Heidelberg Spectralis (Heidelberg, Germany). For statistical análisis T-student, Pearson correlation and linear regression model were used.

Results: Glaucoma and healthy subjects showed homogeneous samples for sex, visual acuity and diabetes (0.35,0.36, 0.71, respectively) but statistically significant difference were found for age, hypertension, corneal thickness (CCT), cup disc, and refractive error ($p = 0.007$, 0.004, 0,01, <0.001, 004, respectively). Average (mean ± standard deviation) for glaucoma and healthy subjects were CFNR global (85.78 ± 16.69, 83.46 ± 16.97), BMO global (261.74 ± 73.88, 232.71 ± 54.32), BMO135G (86.03 ± 17.63, 85.17 ± 16.44), BMO241G (75.15 ± 14.33, 73.79 ± 14.17), BMO347G (66.54 ± 12.03, 65.65 ± 11.55), CCG total (0.94 ± 0.14, 0.94 ± 0.13). Good correlation were found between BMO G, BMO135G, BMO241G with CFNR (0.70, 0.98, 0.98, and 0.97, respectively) and also for CCG total (0.60, 0.83, 0.81, and 0.82, respectively). Linear regression model did not show relation between the BMO and intraocular pressure, CCT, number of drops, numbers of surgery, diabetes, and hypertension.

Conclusion: Good correlation were found between parameters of Bruch's membrane opening with retinal nerve fiber layer and ganglion cell complex.

P1.35
Reproducibility of optic nerve head and macular vessel density by Heidelberg Spectralis II optical coherence tomography angiography (OCT-A) in glaucoma and healthy subjects

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Purpose: To assess the reproducibility of optic nerve head (ONH) and macular vessel density (VD) by Heidelberg Spectralis Module optical coherence tomography angiography (OCT-A)

Methods: Cross-sectional study evaluated one eye in 63 subjects including 33 glaucoma patients and 30 healthy subjects. Glaucoma subjects included 11 eyes for each group mild, moderate and advanced glaucoma. After a complete ophthalmologic examination, two consecutive OCT-A exams were done using Heidelberg Spectralis II OCTA (Heidelberg, Germany) and provided segmented layers on superficial capillary plexus (SCP), nerve fiber layer (NFLVP), superficial vascular plexus (SVP), deep capillary plexus (DCP), intermediate capillary plexus (ICP), deep capillary plexus (DCP). Images were recorded with 10x10° angle and a lateral resolution of 5.7 µm/pixel. AngioTool version 0.6a software was used for analyzed imaging and obtain VD (%). Reproducibility values were summarized as intraclass correlation coefficients (ICCs) and coefficients of variations (CV) using IBM SPSS Statistics 25.

Results: Among ONH VD measurements, ICC (0.90-0.98) were excellent for all layers in moderate and advanced glaucoma, and for SVC and NFLVP in mild glaucoma. ICC (0.7-0.8) were regular to good for DVC, ICP, SVP and DCP in mild glaucoma. CVs were 17.9%-32.8%,15.4%-28.8%, 20.6%-32.9%, to mild, moderate and advanced glaucoma, respectively. For the macula VD measurements, ICC (0.91-0.98) were excellent for SVC, NFLVP, SVP, ICP in mild glaucoma, for all layers in moderate glaucoma, and for SVP, NFLVP, ICP, DCP in advanced glaucoma. ICC (0.7- 0.8) was regular to good for DVC and DCP in mild glaucoma, also for SVC and DVC in advanced glaucoma, CVs were 13.3%-37.7%; 14%-29%.12.3%-23.8%, to mild, moderate, and advanced glaucoma, respectively. Among healthy subjects ICCs (0.95-0.99) were

excellent all layers in ONH VD and macula VD measurements. CVs were 19.4%-30.7%, and 17%-48.6%, respectively.

Conclusion: Spectralis Module OCT-A served to quantify macular and ONH VD with an excellent and good reproducibility in most layers of the retina. Although, the coefficient of variation was high for some layers of the retina.

P1.36
Contrast sensitivity in glaucoma patients with visual field defects in different locations

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Purpose: To determine whether the contrast sensitivity (CS) is associated with visual field (VF) sensitivity (VFS) and how the location of VF defect is associated with the CS in glaucoma patients.

Methods: This study enrolled 238 eyes with primary open-angle glaucoma who underwent 24-2 standard automated perimetry and CS measurement on the same day. Subjects were divided into four groups based on the presence of visual field defects in the superior, inferior, both, or neither hemifields. Association of CS at 0.3 m and 5 m distances with the VFS in various VF sectors was explored with regression analyses.

Results: Eighty-three, 58, and 47 eyes had VF defect in the superior, inferior and both hemifields, respectively, and 50 did not show VF defect in either hemifield. There were overall significant correlations between CS and VFS in all sectors in the entire cohort. However, the relationship differed according to the location of VF defect. Eyes having visual field defect in the superior hemifield or those with bi-hemifield VF defect tended to show weaker correlation between the CS and VFS in the superior hemifield sectors than the eyes with inferior hemifield defect or no VF defect. Significant correlation between the CS and VFS were more frequently found for the CS at 0.3m than for the CS at 5m.

Conclusion: Correlation between the CS and VFS differed according to both the distances at which the CS was measured, and the locations of VF defect. The CS at near distance tended to be more associated with the VFS than the CS at far distance. The CS was not able to reflect VFS decrease in the superior sectors.

P1.37
OCT (RNFL, GCC) findings in glaucoma clinic patients with normal visual field tests: how to approach and treat

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Purpose: To investigate the role of optical coherence tomography (OCT) parameters in the early glaucoma diagnosis and the management of patients that were examined in a glaucoma department in Greece. The study was conducted as part of a master thesis for MSc in Ophthalmological Imaging.

Methods: Data from 127 eyes (68 patients) from the glaucoma department of a public hospital were retrospectively viewed and statistically analyzed. Open-angle glaucoma (OAG) patients without detectable glaucomatous functional damage, glaucoma suspects and ocular hypertensive patients were included. Only patients with normal visual field (VF) tests over a three-year period of follow-up were eligible for the study. Three groups in relation to patients' management were formed: Group 1: patients needed medication for IOP lowering, Group 2: patients for observation with follow-up tests, Group 3: patients were evaluated to be discharged from glaucoma department without treatment or observation. Case tests were performed, to determine the role of the variables, in order to classify the patients in one of these three teams.

Results: Known facts from literature were confirmed for OAG risk factors, like age and IOP. Lower values of OCT parameters (RNFL,GCC) were correlated with higher chances that the patient would be treated with anti-glaucoma eye drops. Statistical significant differences were observed for group 1 in comparison with group 2 and also for group 1 when compared to group 3, at baseline and at the end of follow-up regarding ganglion cell complex (GCC) thickness, while retinal nerve fiber layer (RNFL) thickness showed statistical significance only at the end point measurements.

Conclusion: Early diagnosis and treatment of glaucoma is important to reduce the risk of progressive and irreversible visual loss. RNFL/GCC analysis is a valuable tool for the evaluation of cases like glaucoma suspects, ocular hypertension or preperimetric glaucoma. As far as management decision is concerned, OCT analysis is one of many established factors taken into account in such a hard decision making. Clinical judgment, based on multiple parameters remains mandatory but regarding imaging, GCC particularly appears to be a significant parameter when dealing mainly with preperimetric glaucoma.

P1.38
Evaluation of ganglion cell parameters and comparison with retinal nerve fiber layer in preperimetric glaucoma, early stage glaucoma and healthy people

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Purpose: It was planned to compare the ganglion cell analysis and peripapillary retinal nerve fiber layer (pRNFL) thickness measurements of the patients with preperimetric glaucoma (PPG) and early glaucoma (EG) and the healthy group.
Methods: A total of 38 eyes of 38 patients with EG, 30 eyes of 30 patients with PPG, and 35 eyes of 35 healthy control group were retrospectively included in the study. The eyes included in the study were grouped as control, PPG and EG according to the mean deviation (MD) of the visual fields using the Humphrey central 24-2 SITA-Standard program. Data for pRNFL thickness and macular ganglion cell analysis were collected by Topcon Swept–Source Optical Coherence Tomography (SS – OCT). Area under the curve (AUC) of parameters from OCT were calculated and compared with each other. Statistical analyzes were performed with SPSS 22.0 (SPSS Inc. Chicago IL,USA) program. $p < 0.05$ was accepted as the limit of significance.

Results: All optic nerve head, pRNFL and ganglion cell parameters in OCT differed significantly between control and PPG and control and EG ($p < 0.05$). GHIPL, GCC and RNFL thickness values in the PPG and EG groups were significantly lower than the control group in all quadrants ($p < 0.05$). No significant difference was observed between the PPG and EG groups,except for the GCC superior thickness, which is one of the OCT parameters ($p >$

0.05). The VF values of the EG group and the values of the PPG and control groups were found to be significantly different ($p < 0.05$). Vertical C/D ratio gave the the highest AUC that could distinguish the control and PPG groups (AUC:809). The mean pRNFL thickness was shown to be the most valuable diagnostic parameter between the control and EG group ($p < 0.05$).

Conclusion: OCT parameters were not significantly superior to each other in the distinction between control-PPG and control-EEG. In the diagnosis of glaucoma, the evaluation of OCT and visual field parameters is still considered to be the most valid diagnostic method.

P1.39
Structure-function correlation between OCT and both Visual Field SITA Standard and SITA Faster

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Purpose: To determine the structure-function relationship between equivalent visual field areas obtained with the Humphrey Field Analyzer (HFA) 24-2 SITA Standard and 24-2C SITA Faster visual field, and spectral-domain optical coherence tomography (OCT) measurements in patients with glaucomatous optic neuropathy.

Methods: 102 patients with open-angle glaucoma were prospectively recruited. Eligible participants for the glaucoma group were required to have elevated intraocular pressure and glaucomatous optic nerve head morphology. All participants underwent reliable automated perimetry with HFA and optic nerve head and macula imaging with the RTvue-100, Optovue OCT. Principal component analysis of the mean threshold values for the visual field test points was performed independently for each hemifield. Pearson correlations were calculated between structure and function.

Results: Mild to moderate ($p < 0.05$) correlations were observed between the peripapillary RNFL thicknesses and both the 24-2 and the 24-2C visual field regions. In particular, the most significant correlations ($p < 0.001$) were found for the fibers of the upper and temporal sectors. Excellent ($p < 0.001$) correlations were observed between the visual field regions and the GCC thicknesses and both the 24-2 and the 24-2C visual field regions. Central macula points tested with 24-2C SITA Faster were found to correlate well ($p < 0.001$) with fibers in the superior, temporal, and inferior sectors of the RNFL. Excellent ($p < 0.001$) correlations have also been found with the GCC thickness.

Conclusion: Retinal sensitivity assessed with 24-2 and 24-2C HFA correlated moderately well with RNFL and GCC thickness measured by OCT. We can conclude how the additional 10 points of the SITA Faster allow a more complete perimetric assessment of glaucomatous disease and, in combination with GCC and RNFL measurements, are therefore a promising parameter for glaucoma detection and monitoring.

P1.40
Differentiating chiasmal macroadenoma from primary open angle glaucoma by optical coherence tomography

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Purpose: To investigate optical coherence tomography findings that differ between chiasmal macroadenomas (MA) and primary open angle glaucoma (POAG).

Methods: Consecutive patients diagnosed to have chiasmal macroadenoma (> 10 mm) were included in the study. Patients with other neurologic disorders, history of trauma and use of systemic medications known to have toxic effect on optic nerve and retinal nerve fiber layer were excluded. Primary open angle glaucoma patients matched for age and mean defect (24-2 SITA standard test) of macroadenoma patients constituted the glaucoma group. All patients had complete ophthalmic examination, visual field testing and circumpapillary and macular imaging with Cirrus HD-OCT.

Results: Results: Average MD of 53 macroadenoma and 42 POAG patients were -3.34 ± 3.6 and -3.43 ± 4.3, respectively ($p = 0.909$). Average VFI and PSD of both groups were similar ($p = 0.541$; $p = 0.188$). Average thickness of cpRNFL of macroadenoma group (87.4 ± 13.0) was significantly thicker than glaucoma group (78.9 ± 11.2) ($p = 0.001$). Superior quadrant of cpRNFL of the macroadenoma group was thicker than the glaucoma group ($p = 0.001$); inferior quadrants were similar ($p = 0.902$). The macular ganglion cell-inner plexiform layer (mGCIPL) average thickness was 82.5 ± 6.6 in macroadenoma and 75.9 ± 8.7 in glaucoma groups, respectively ($p = 0.000$). Thickness of superior nasal and inferior nasal sectors of both groups was similar ($p = 0.412$ and $p = 0.899$), while both superior temporal and inferior temporal sectors were significantly thinner in the glaucoma group ($p = 0.000$; $p = 0.000$).

Conclusion: Thickness measurements of average and superior cpRNFL, average and temporal macular GCIPL were useful in differentiating macroadenomas from primary open angle glaucoma with identical visual field damage.

P1.41
Association between retinal vascular parameters and retinal nerve fiber layer thickness in open angle glaucoma: the ALIENOR population-based study

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Purpose: To analyze the association of retinal vascular parameters measured with a computer-assisted program with both open angle glaucoma (OAG) and retinal nerve fiber layer thickness (RNFLT) in an elderly population.

Methods: Population-based cohort longitudinal study performed at Bordeaux University. Of the 963 participants of the ALIENOR baseline visit, 562 were included in this analysis. We used a

computer-assisted program (Singapore "I" Vessel Assessment) to measure quantitative retinal vascular parameters (vessel caliber, vascular tortuosity, fractal dimension) from retinal photographs. RNFLT was assessed with spectral-domain optical coherence tomography (software version 5.4.7.0; Spectralis, Heidelberg Engineering Co., Heidelberg, Germany). OAG diagnosis was determined using Foster et al. classification. The Main outcome measures were the associations between retinal vascular parameters and glaucoma or RNFLT at ALIENOR 1 (A1) visit and longitudinal RNFLT changes with time.

Results: 42 persons (7.5%) had glaucoma in the analysis. After adjusting for age, gender, smoking status, BMI, pulsed pressure and diabetes mellitus, arteriolar and venular caliber (odds ratio [OR], 0.935; 95% confidence interval [CI], 0.890-0.982; p = 0.007 and OR: 0.927 (95%CI: 0.888-0.968), p = 0.0006 - respectively), and arteriolar fractal dimension (OR: 0.539 (95%CI: 0.302-0.962), p = 0.04) were significantly associated with OAG. Arteriolar and venular caliber were significantly associated with RNFLT at A1 visit (OR: 0.435 (95%CI: 0.212-0.658), p = 0.0002 and OR: 0.486 (95%CI: 0.307-0.666, p < 0.0001 respectively). Vascular parameters were not associated with RNFLT longitudinal changes with time.

Conclusion: Our study found that glaucoma is associated with specific retinal vascular features. Interestingly, our study also suggests that retinal vascular features are not associated with optic nerve head changes with time in a normal population.

P1.42
clectic risk factors for ocular hypertension and glaucoma patients in the Iberian Peninsula

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Purpose: To summarize the prevalence of non-intraocular pressure (IOP) -related characteristics in a cohort of individuals of Spain and Portugal, to pay special attention to modifiable risk factors in order to allow prevention and control.

Methods: A multicenter, cross-sectional, descriptive, observational cohort study was done in a representative sample of 412 volunteers of both sexes, classified as ocular hypertension subjects (OHTG; n = 198) and primary open-angle glaucoma patients at initial stage (POAGG; n = 214) that were recruited in 8 hospitals of Spain and Portugal. Data from the clinical history, anamnesis, and ophthalmological examination (intraocular pressure -IOP-, central corneal thickness, optical coherence tomography, and visual field) were recorded to optimize the study groups. Main variables were sociodemographics, anthropometric, endocrinologic, nutritional, toxic habits, psychotropic drugs, cardiovascular and respiratory data. Statistics were done by the SPSS 28.0 program

Results: Mean age of the study population was 62 (15) years. Distribution by gender was 53% man/47% woman in the POAGG, and 39% man/61% woman in the OHTG. In the POAGG the IOP was 16 (4) in the right eye (RE), and 18 (6) in the left eye (LE) whereas in the OHTG the IOP was 20 (2) in the RE and 20 (3) in the LE. 14 potential risk factors for glaucomatous optic nerve degeneration (OND) were listed as follows: age, gender, thyroid dysfunction, body mass index, coffee or tea consumption, smoking or drinking habits, psycothrophic drugs, cold hands/ feet síndrome, migraine, asthma, chronic obstructive pulmonary disease (COPD), and/or sleep apnea/hypopnea syndrome (SAHS). In both groups major prevalence pertained to the coffee habit (2/3 of the population; p < 0.001), overweight (1/2 of the study volunteers: `p < 0.001) and psycotrophic drug intake (1/3 of the participants; p < 0.001), whereas the less frequent comorbidities were asthma, COPD and SAHS.

Conclusion: In this Iberian peninsula cohort, new non-IOP-related factors have been identified (some of them modifiables) to help assessing the POAG risk and optic nerve degeneration, in order to prevent glaucoma blindness.

P1.43
A case of idiopathic iridoschisis

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Purpose: To show a case of a female old patient affected by primary idiopathic iridoschisis threated with laser iridoplasty before cataract surgery

Methods: We reported a case of a patient who presented under our observation with blurred vision and a progressive loss of sensitivity to contrast. Biomicroscopic objectivity featured a nuclear cataract and a jagged lower iris stroma and strains of iris floating in the anterior chamber partially occluding the iridocorneal angle. No history of previous trauma or ophthalmic surgery. The IOP was about 22 mmHg in both eyes. The OCT of the anterior segment confirmed alterations of the iris and a secondary closure of the inferior iridocorneal angle. We decided, before cataract surgery, to treat the patient with lower peripheral laser iridoplasty to reduce the risk of incarceration of iris strains in access to the cornea. We followed the laser effects with AS OCT

Results: We noticed a complete compaction of the iris stroma after the laser and a partial opening of the angle. After cataract surgery the angle became completely open and the IOP dropped to 13 mmHg without antiglaucomatous drugs

Conclusion: Primary iridoschisis is a very rare condition that can affect the eye causing a IOP raise and increase of intra and postoperative complications in case of cataract surgery. Laser iridoplasty is a safe and well tolerated procedure that can solve the situation helping to restore a normal anatomy. Anterior Segment OCT is a valid aid both in the diagnostic and follow-up phases.

P1.44
Microspherophakia in Weill-Marchesani syndrome, the ophthalmologist should not be missed

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Purpose: To recognize ocular presenting of Weill-Marchesani syndrome

Methods: A 42 years-old female with severe intellectual disabilities. She presented with difficulty on movement and was hit by surrounding objects. Her visual acuity was light perception. Her intraocular pressure (IOP) was 69 and 70 mmHg in right and left eye, respectively. Glaucoma was diagnosed and she was treated with laser diode trans-scleral cyclophotocoagulation for twice sessions. She was suffered from visual impairment while her sister sought out the second ophthalmologist.

Results: Her appearance was a short stature with 140 centimeters height. She was diagnosed as Weill-Marchesani Syndrome with closed-angle glaucoma. Microspherophakia were noted intra-operative cataract surgery with intraocular lens implantation. Her ocular biometry parameter in right and left eyes were following, axial length 33.0 and 34.3 mm, anterior chamber depth 3.20 and 3.14 mm, keratometry K1 42.75 and K2 43.75, K1 40.00 and K2 44.00 diopters, IOL power (A-constance 118.3) -3.0 and -4.0 diopters and central corneal thickness 660 and 667 micron. Post-operative IOP were controlled with anti-glaucoma medication but her visual acuity was not regain following from chronic IOP elevation with severe glaucomatous optic neuropathy.

Conclusion: In intellectual disabilities adult, providing comprehensive eye care need improvement [1]. In glaucoma patient with myopic refraction and short stature, Weill-Marchesani syndrome should not be overlooked [2, 3]. There is no standard protocol for management in microspherophakic person [4]. In patient whose presented with closed-angle glaucoma and lens subluxation, lensectomy should be performed as a primary treatment.

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P1.45
Complications after dexamethasone intravitreal implant in diabetic macular edema patients

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Purpose: To assess complications after intravitreal dexamethasone implant (DEXI) in eyes with diabetic macular edema (DME), naïve and non-responders to vascular endothelial growth factor inhibitors (antiVEGF).

Methods: Retrospective real-world study conducted on consecutive DME patients with DEXI and were controlled at 2, 6 and 12 months. Subjects were divided in groups: naïve patients and non-responders to previously treated eyes with ≤ 3 antiVEGF injections (early switch) or > 3 antiVEGF injections (late switch). IOP elevation defined as an increase in IOP of ≥ 10 mmHg from baseline, IOP ≥ 25 mmHg, or IOP ≥ 35 mmHg according to MEAD trial. Outcomes were retreatment and safety after DEXI.

Results: A total of 112 eyes were finally included in the study with a median age of 63.94 (13.12) years. At baseline, there were no statistically significant differences between gender, BCVA, type of diabetes mellitus, DME subtype, state of the lens and intraocular pressure (IOP). At month 2, we observed ocular hypertension (OH) in 38 (33.93%) eyes (10 (26.32%) naive eyes, 15 (39.47%) early switch eyes and 13 (34.21%) late switch eyes) without differences between groups (p = 0.69). It was no necessary glaucoma surgery. We observed no association between previous antiVEGF number and OH after DEXI. We found associations between OH with greater diabetic retinopathy grade (OR = 1.96 (1.09 to 3.63), p = 0.025) and with more frequency in male gender (OR = 3.461 (1.18 to 12.65), p = 0.035). 19 (16.96%) phakic eyes required cataract surgery in the study period, but the effects of DEXI on IOP were similar in phakic and pseudophakic eyes in our study. Eighty-nine (79.46%) eyes received additional DEXI or antiVEGF injection after first DEXI. However, IOP showed no statistically significant differences between groups according to reinjections number over 12 months.

Conclusion: Complications after dexamethasone implant were similar in all groups. Ocular hypertension increases in patients with advanced diabetic retinopathy.

P1.46
Optic disc structural and functional assessment in patients with primary Raynaud's phenomenon

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Purpose: Vasospastic conditions, such as Raynaud's Phenomenon (RP), have been proposed as major risk factors for normal tension glaucoma development. Our aim was to assess optic disc structural and functional parameters in patients with Primary RP (PRP).

Methods: This study enrolled patients with PRP and healthy age-matched controls. Subjects underwent evaluation of intraocular pressure (IOP) by applanation tonometry, anterior chamber angle and optic disc structural parameters measured by optic coherence tomography (Zeiss Cirrus HD-OCT 5000Ò), and optic nerve functional parameters by automated standard perimetry (Octopus 900®). Exclusion criteria included prior history of glaucoma.

Results: Twenty-four eyes of 24 patients were included in the Control group, with a mean age of 44.20 ± 4.67 years, and 20 eyes of 20 patients in the PRP group, with a mean age of 43.00 ± 6.08 years (p = 0.20). Mean IOP was within the normal range in both groups (p = 0.25). Optic disc structural and functional parameters were equivalent between groups (p > 0.05), although measurements were globally lower in PRP group. Frequency of vasospastic attacks was inversely correlated with inferior retinal nerve fiber layer thickness (p = 0.04, r = -0.10).

Conclusion: Our findings suggest that although a greater frequency of vasospastic events in PRP may predispose to inferior retinal nerve thinning, optic disc structural and functional assessment was similar to that of healthy age-matched controls. As such, RP without a secondary cause might not induce sufficient damage to result in glaucomatous neuropathy.

P1.47
OCT in optic disc drusen: what do we have to look at?

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Purpose: To identify the impact on optical coherence tomography (OCT) and OCT angiography (OCTA) parameters depending on the severity of the visual field (VF) in optic disc drusen (ODD).

Methods: We performed a retrospective cross-sectional study of patients with ODD evaluated at Hospital Universitari Vall d'Hebron. All subjects underwent an ophthalmic examination, including best corrected visual acuity, intraocular pressure measurement, OCT and OCTA images (Cirrus HD-OCT AngioPlex Model 5000) and Automated static perimetry (Humphrey Field Analyzer II 750, SITA 24-2 programs).

Results: A total of 36 eyes of 21 patients with ODD were evaluated. Seventy-five percent were female and 80,9% had bilateral ODD, mean age was 53,22 years. Of 36 eyes, 15 of them had buried ODD and 21 had superficial ODD. Regarding VF severity: 30,6% had a normal VF; 27,8% had mild VF loss (Mean Deviation –MD-<-6,00dB); 22,2% had moderate VF loss (MD -6,00 to -12,00dB) and 19.4% had severe VF loss (MD > -12,00dB). Eyes with severe VF loss had greater mean peripapillary retinal nerve fiber layer (RNFL) thinning (p 0.001), greater mean and minimum ganglion cell layer (GCL) thinning (p 0.000 in both) and lower mean optic nerve head (ONH) flux index and ONH global perfusion (p 0.009 and p 0.007). We also identified the keypoints in OCT report that are characteristic of ODD: great neuroretinal rim thickness associated with RNFL thinning, which can be more extensive than in glaucoma and abnormalities on the ONH parameters with typical low cup/disc ratio (Fig. 1).

Conclusion: Qualitative parameters that appear in the OCT report from patients with ODD differ from those with glaucoma. Twenty per cent of patients with ODD presented a severe VF loss. In this group we observed a lower RNFL thickness, minimum and mean GCL thickness, ONH flux index and ONH global perfusion compared to the ones with normal VF.

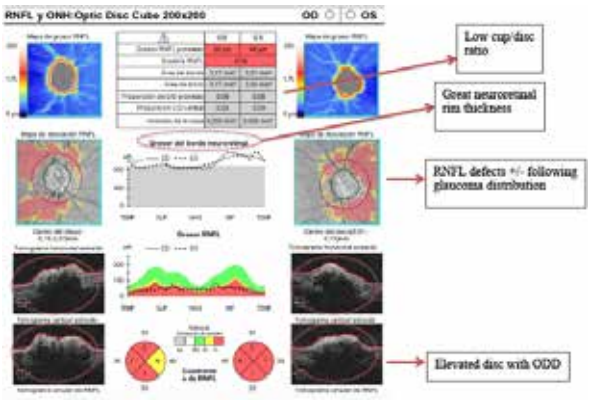

Figure 1. Key points in OCT report in ODD.

P1.48
Bilateral choroidal detachment in the absence of previous intraocular surgery: a case series

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Purpose: To present two cases of bilateral choroidal detachment related to subacute angle-closure glaucoma in patients with no history of previous intraocular surgery.

Methods: The first patient was an 86-year-old woman, with intraocular pressures (IOP) of 40.00/36.00 mmHg, treated with preservative-free double therapy of dorzolamide/timolol. One week later, the patient presented bilateral vision loss with well-controlled pressures. The anterior exam showed LOCS III N4C3 cataracts, angle grade 2 (Shaffer) and the fundus and ultrasound exams revealed a bilateral inferotemporal choroidal detachment with an absence of neoplasia or other systemic cause.
The second patient was a 64 year-old-woman, presenting bilateral vision loss after lung transplantation for pulmonary hypertension. The exam revealed bilateral prominent choroidal detachment in both eyes, angle grade 1-2 (Shaffer), LOCS III N2C2 cataracts and IOP of 20.00 mmHg in both eyes.

Results: After one week of receiving topical prednisolone in the absence of hypotensive treatment, the patients showed reattachment of the choroidal detachment. Six months after cataract surgery, the patients remain stable without choroidal effusion regression or new episodes of angle-closure.

Conclusion: Hypotensive treatment following chronic angle closure can lead to choroidal effusion, similar to cases of acute-angle closure treated with oral carbonic anhydrase inhibitors. However, choroidal effusion can result from the congestion of the choroidal vessels during the beginning of a hypertensive episode, as well as from the anterior rotation of the ciliary body, and the anterior displacement of lens–iris diaphragm. The combined strategy of applying topical corticosteroids and removing hypotensive treatment could be useful for the initial management of choroidal effusion. In addition, performing cataract surgery after choroidal reattachment can prevent future episodes of angle-closure.

P1.49
The relationship between cerebrovascular autoregulation and retrobulbar blood flow in glaucoma patients

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Purpose: To compare differences in hemodynamic parameters and cerebrovascular autoregulation in normal-tension glaucoma (NTG) and high tension glaucoma (HTG) patients.

Methods: The perspective pilot study included 10 patients with NTG (age 67.5 (2.3) y) and 8 patients with HTG (age 73.2 (2.7) y. During the study intraocular pressure (IOP), retrobulbar blood flow (Color Doppler imaging), cerebrovascular autoregulation (Digital transcranial doppler (Delica EMS-9UA, Germany) and non-invasive blood pressure monitor (Finapres) were assessed. Cerebrovascular autoregulation status was estimated by calculating the noninvasive volumetric reactivity index (VRx) as a moving correlation coefficient between arterial blood pressure and non-invasively-measured intracranial blood volume slow waves. Mean volumetric reactivity index (mVRx) and duration

of longest cerebrovascular autoregulation impairment (LCAI) (s) (with VRx > 0) were calculated. The level of significance p < 0.05 was considered significant.

Results: Both groups were not statistically significantly different in sex (p = 0.426), systolic BP (p = 0.393) and diastolic BP (p = 0.186). HTG patients were statistically significantly older than NTG patients (p < 0.001). NTG patients had higher mVRx (0.056 (0.165)), compared to HTG patients (-0.070 (0.249)), however the difference was not statistically significant, p = 0.216).NTG patients had longer duration of LCAI (107 (77) s), compared to HTG patients (75 (85) s), however the difference was not statistically significant (p = 0.414).There was significant correlation between duration of LCAI (with VRx > 0) and temporal posterior ciliary artery peak systolic velocity in NTG patients (r = -0.494, p = 0.043) and HTG patients (r = -0.946, p < 0-001). There was significant correlation between duration of LCAI (VRx > 0.2) and central retinal artery peak systolic velocity in NTG patients (r = -0.675, p = 0.032) and temporal posterior ciliary artery peak systolic velocity HTG patients (r = -0.762, p = 0.028).

Conclusion: Higher cerebrovascular autoregulation impairment correlated with lower retrobulbar blood flow in HTG and NTG patients. Further studies are needed to analyze the relationship between cerebrovascular autoregulation and retrobulbar blood flow for glaucoma patients.

P1.50
Structure-function analysis of the peripapillary intrachoroidal cavitation

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Purpose: To study the correlation between peripapillary intrachoroidal cavitations (PICC) location and the distribution of visual field defects (VFD) using Garway-Heath (G-H) sectors. Such a correlation could contribute to differentiate glaucoma from VFD related to PICC.

Methods: We prospectively analyzed patients diagnosed with PICC, based on optical coherence tomography (OCT) scans. Eyes combining peripapillary staphyloma and tilted disc (= combination eyes) served as controls. VF testing was performed using the Humphrey visual field analyzer SITA standard central 24-2 program and we assessed VFD according to Anderson's criteria. We excluded eyes with glaucoma. Using G-H's method, we assessed the association between OCT location of PICC and the distribution of VFD. We also measured the ovality index (OI), the ratio of the minimum to maximum diameters of the discs.

Results: 74 eyes of 55 patients (20 males; mean age 57 ± 19 years) were included: 61 combination, 13 PICC. PICC were found in sector B in 84,6% (11/13) of cases. The positive rate for Anderson criteria was 61,5% (8/13) in PICC and 11,5% (7/61) in combination eyes (Fisher, p < 0.001). Among the eyes with VFD, clusters were found in 25% (2/8) of PICC and 42,9% (3/7) of combination eyes, with a higher prevalence in zone D (25% of PICC; 28,6% of combination eyes). In 50% (1/2) of the cases there was a correlation between PICC location and the distribution of clusters. The mean OI was 0.6 and 0.9 respectively for eyes with and without PICC (Student, p < 0.001). The proportion of OI ≤ 0.8 (low OI) in eyes with PICC was 76,9% (10/13) and that in combination eyes 27,9% (17/61) (Fisher, p < 0.001).

Conclusion: Exclusion criteria application left too few eyes to draw a formal conclusion concerning the correlation between PICC location and the distribution of VFD. We confirm, however, that the mean OI is lower in eyes with than those without PICC, suggesting more stress in PICC eyes. Regardless of the group, low OI was associated with more VFD, confirming a previous study and suggesting greater tissue vulnerability or higher tissular stress in PICC. Studies including more patients will explore these hypotheses.

P1.51
Protein kinase C regulates hypoxia-induced effects on NMDAR-mediated excitatory retinocollicular neurotransmission in the in vitro model of central retinal projections

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Purpose: The reduction of ocular blood flow is common in patients with glaucoma and ocular hypertension and leads to hypoxic states of the retina and optic nerve head. In view of this, hypoxia contributes not only to the onset of glaucoma, but also to its progression and subsequent degradation of signals transmission in retinal projections. We have previously reported that hypoxia-induced pathological long-term potentiation (LTP) of NMDA retinocollicular transmission is associated with changes in NMDAR subunits - a protective cellular mechanism that decrease the calcium influx. In this study, we tested the hypothesis that protein kinase C (PKC) pathway is involved in hypoxia-induced effects on NMDA retinocollicular transmission.

Methods: We developed the in vitro model of the central retinal projections - coculture of dissociated retinal cells and superficial superior colliculus (SSC) neurons. Using paired patch-clamp technique, we recorded pharmacologically isolated evoked NMDA postsynaptic currents in SSC neurons by generation action potentials in presynaptic retinal ganglion cells under control and hypoxic conditions. Spontaneous postsynaptic currents we recorded in absence of presynaptic stimulation. We tested effect of chelerythrine chloride (ChC, 5 μM) - an inhibitor of PKC. The decay time constants were determined from a single exponential fit of the decay phase of currents.

Results: The presence of ChC completely blocked LTP of NMDA transmission induced by hypoxia. The ChC also abolished the hypoxia-induced increase of spontaneous NMDA currents amplitudes but did not affect the increased occurrence frequency. Moreover, we observed that ChC blocked the decrease of the decay time of evoked and spontaneous currents (control 48.2 ± 4.6ms; hypoxia 13.5 ± 5.4ms; hypoxia in presence of ChC 45.8 ± 5.5 ms) that reflects elimination of changes in NMDAR subunits ratio.

Conclusion: The results obtained are consistent with our hypothesis. Inhibition of PKC pathway completely blocked LTP of NMDA retinocollicular transmission and lead to the offset of associated changes in NMDA receptor subunits. The revealed electrophysiological basis of plasticity and protective mechanism in response to hypoxic injury might be targeted to prevent lesions of signals transmission in retinal projections in glaucoma patients.

This scientific material is submitted to the 2022 ARVO meeting.

P1.52
ELAVL1/HuR is required for both endo- and exogenous neuroprotection in retinal ganglion cells

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Purpose: To evaluate the impact of HuR gene silencing on the ratio of age-related degeneration of Retinal Ganglion Cells (RGC), which potentially describes the efficiency of endogenous neuroprotection mechanisms, as well as to assess the exogenous neuroprotection capacity of HuR-silenced RGC in rat glaucoma model treated with metallothionein.

Methods: Thirty-five eight-week-old male Long Evans rats were divided into two groups: experimental and control. Animals from experimental group received intravitreal injection of AAV-shRNA-HuR. Control group received injection of AAV-shRNA scramble control. Animals from both groups were sacrificed in 3 different time points: 2, 4 and 6 months after injection. Both healthy and treated retinas from each animal were collected and processed as whole mounts for immunostainings and RGC count. For the second trial, animals were divided into groups and transfected with virus particles as described above. To induce chronic glaucoma model, 8 weeks after AAV injection, unilateral episcleral vein cauterization was performed. Half of animals from each group received intravitreal injection of metallothionein (MT), the other group received PBS injection. During the experiment IOP was monitored. Both healthy and treated retinas from each animal were collected and processed as whole mounts for immunostainings and RGC count.

Results: RGC count (per visual field under 20x magnification) was 310 ± 31, 296 ± 25, 189 ± 41 in experimental group and 399 ± 51, 395 ± 49, 390 ± 23 in control respectively for 2, 4 and 6 months after injection (Kaplan-Mayer trend rank $p < 0.0001$). Loss of RGC in central retina was 33.7% in animals from shRNA-MT-treated glaucoma and 11.4% in shRNA control-MT-treated glaucoma ($p < 0.05$). In peripheral part of the retina the loss was 37.4% in animals from shRNA-MT-treated glaucoma and 11.5% in shRNA control-MT-treated glaucoma ($p < 0.01$).

Conclusion: Silecing of HuR gene enhanced age-related loss of RGC which translates into impaired endogenous neuroprotection pathways morover the absence of HuR critically limits neuroprotective activity of exogenously delivered metallothionein.

P1.53
Role of the integrated stress response in glaucoma

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Purpose: To investigate the role of the integrated stress response (ISR) in glaucoma using lamina cribrosa (LC) cells from normal and glaucomatous donors.

Methods: Single cell analysis of lamina cribrosa cells from normal and glaucoma donors was performed in QUB. At data analysis genes involved in the integrated stress response {Activating Transcription factor 4 (ATF4), DNA Damage Inducible Transcript 3 (DDIT3/CHOP), Glucose regulated protein 78 (GRP78), Glucose regulated protein 94 (GRP94), Eukaryotic translation initiation factor 2 subunit 1 (Eif2α)} were noted to be significantly increased in glaucoma. This was confirmed using PCR. Normal and glaucoma donors were then treated with Integrated Stress Response Inhibitor (ISRIB) and gene expression measured.

Results: Gene expression of ISR related genes was increased in glaucomatous LC cells compared to normal LC cells. Treatment with ISRIB decreased the relative expression of ISR related genes in normal and glaucoma LC cells.

Conclusion: The integrated stress response plays a key role in the pathogenesis of glaucoma. ISRIB represents a novel potential treatment for glaucoma but requires further evaluation.

P1.54
Ultrastructural visualization of lymphatic vessels of filtration blebs after non-penetrating glaucoma surgery

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Purpose: To carry out a structural assessment of a filtering bleb in patients with primary open angle glaucoma (POAG) after non-penetrating deep sclerectomy (NPDS).

Methods: 12 patients with POAG were examined 12-18 months after NPDS. IOP level and AS – OCT were examined. Ultrastructural study was performed on a laser confocal microscope LSM 710. The samples were analyzed in layers in the form of 2D slices or volumetric Z-stacks. Immunohistochemical staining of conjunctival samples for podoplanin expression was performed using primary (dilution 1:40) and secondary (dilution 1:2000) antibodies labeled Alexa Fluor 488 and cell nuclei (DAPI)
Samples of conjunctiva and subconjunctival tissue were obtained by surgical excision of a bleb part during reoperations. Group 1 consisted of 4 patients with functional, diffuse blebs with displacement to the cornea, causing discomfort in a patient. Group 2 consisted of 8 patients with non-functional scar-altered blebs. The control group - 8 patients who underwent non-glaucoma surgery.

Results: Group 1 (IOP: 12-16 mmHg without medications; AS – OCT revealed that intrascleral canal communicated with loose

subconjunctival tissue in the form of multiple slit-like spaces; from 5 to 7 lymphatic vessels with immunohistochemical staining of the vessel walls with podoplanin were determined in each sample of functional blebs). Group 2 (IOP: 22-26 mmHg with maximum medical therapy; non-functional filtering blebs; AS – OST revealed intrascleral canal to be slit-like, subepithelial tissue is compacted, single cells with a sufficient level of expression of podoplanin were determined in bleb tissue samples; lymphatic vessels were not detected in any case). Laser confocal microscopy of conjunctival samples of control group individuals revealed from 1 to 2 lymphatic capillaries in 3 samples out of 8 examined.

Conclusion: Functional filtering bleb is a loose subconjunctival structure accumulating aqueous humor, with a developed system of lymphatic capillaries.

P1.55
Reduced mitochondrial DNA copy number in peripheral blood lymphocytes of POAG patients

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Purpose: Glaucoma is a group of complex optic neuropathies, which cause vision loss in more than 70 million people worldwide. Its pathophysiology is not fully understood. Since retinal ganglion cells (RGCs) have a high energy demand, suboptimal mitochondrial function may put the survival of these neurons at risk. In the present study, we explored if peripheral blood lymphocytes (PBL) mitochondrial DNA (mtDNA) quantity or quality could reflect a role for mitochondrial impairment in development of primary open angle glaucoma (POAG).

Methods: We have selected four age- and sex-matched groups, namely POAG patients with high intraocular pressure at diagnosis (high tension glaucoma: HTG; n = 98), normal tension glaucoma patients (NTG, n = 37), ocular hypertensive controls (n = 9), and cataract controls (n = 32), all without remarkable comorbidities. PBL DNA was isolated and mtDNA copy number was assessed by qPCR quantification of mitochondrial D-loop and nuclear B2M gene. MtDNA copy number comparison between the groups was conducted using Kruskall-Wallis test combined with Dunn's multiple comparison test in GraphPad Prism and R software (V4.1.2). In addition, the presence of the common 4,977 base pair mtDNA deletion was assayed by a sensitive PCR, which amplified the region containing the specific breakpoints in the mitochondrial genome.

Results: Analysis of the mtDNA copy number revealed a significant reduction in HTG patients (median mtDNA copies per cell: 60.82, interquartile range (IQR): 47.75-80.26) compared with NTG patients (median mtDNA copies per cell: 76.77, IQR: 62.30-99.54, p-value < 0.01) and cataract controls (median mtDNA copies per cell: 85.90, IQR: 71.82-105.1, p-value < 0.001), but not with ocular hypertensive controls (median mtDNA copies per cell: 77.22, IQR: 67.98-109.8). The common 4,977 base pair mtDNA deletion was not detected in any of the participants.

Conclusion: The mtDNA copy number was reduced in PBL-DNA of HTG patients. Most likely, this reflects a suboptimal mitochondrial function, which together with ageing and/or high intraocular pressure, may lead to mitochondrial dysfunction during life in RGCs and may contribute to glaucoma pathology in some HTG patients. These patients may be amenable for a mitochondria-targeted drug treatment.

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P1.56
Unusual extreme seasonal intraocular pressure (IOP) fluctuation in primary open-angle glaucoma (POAG)

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Purpose: To demonstrate a rare case of POAG characterized by wide seasonal IOP variation.

Methods: A 40-year- old Caucasian male, recently diagnosed with POAG, was referred to our glaucoma department for further examination. He had a family history of POAG and no prior medical history. He admitted suffering from occupational stress and being type A personality.

Results: Clinical examination revealed the following: Best corrected visual acuity 20/20 OU, Goldmann applanation tonometry 17mmHg OU, Central corneal thickness 500 μm OU, c/d ratio 0,7 OU, Visual field index (VFI) 100% OU, Nerve fiber layer (NFL) normal OS and inferotemporal defect OD. Pigmentary glaucoma and Pseudoexfoliation glaucoma were excluded. No other lesions were present in AC or retina. The patient was started on latanoprost/timolol fixed combination once daily. Seasonal IOP measurements during 4-year follow-up revealed a large fluctuation OU, varying between 11 mmHg in the summer and 24 mmHg in the winter. Despite maximal topical 4-drug administration, the NFL OU showed progression consistent with glaucoma optic neuropathy and VF OU slight deterioration. The patient was then referred to the pathological department, where the diagnosis of autonomic dysfunction was made.

Conclusion: Autonomic dysregulation has been described in both POAG and normal tension glaucoma patients in the literature. Though often overlooked at in clinical practice, the sympathetic context of the disease could possibly provide a new insight into the pathogenesis and treatment of glaucoma patients.

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P1.57
The effect of miR-29b expression on ADAM12 & ADAM19 in the lamina cribrosa in primary open angle glaucoma

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Purpose: The key site of fibrotic remodelling in primary open angle glaucoma is the lamina cribrosa (LC) of the optic nerve head (ONH). Increased expression of extracellular matrix (ECM) genes, including the pro-fibrotic transforming growth factor-β1 (TGFβ1) leads to alterations in the architecture of the laminar plates resulting in damage to the retinal ganglion cells. A disintegrin and metalloproteinase (ADAM) 12 & 19 are transmembrane proteases involved in cellular activities including cell adhesion, signalling, growth factor regulation and proteolysis. Overexpression of ADAM 12 & 19 has been reported in cardiac, renal and lung fibrosis. MiR-29b is an antifibrotic microRNA which negatively regulates ECM gene expression. MiR29b has been shown to be downregulated in the trabecular meshwork in glaucoma. Our research aim was to investigate the effects of miR-29b on the expression of ADAM 12 & 19 in human lamina cribrosa cells in glaucoma.

Methods: Human lamina cribrosa cells from three healthy and three glaucoma donors were cultured under physiological conditions. Cells were transfected with either 5nM of miRNA-29b-3p mimic or a negative control using HiPerFect transfection reagent. A subset of cells were then treated with 10ng/ml TGFβ1 for 24 hrs. Transfection efficiency was confirmed using SiGlow fluorescence and qPCR. Changes in expression of ADAM 12 & 19 mRNA levels amongst all treatment groups were analysed by Quantitative real time reverse transcriptase Polymerase Chain Reaction (qRT-PCR).

Results: ADAM 12 & 19 expression is significantly upregulated in glaucoma vs normal LC cells. TGFβ1 treatment in normal LC cells downregulated miR-29b expression and upregulated ADAM 12 & 19 expression. Transfection with miR-29b significantly downregulated the expression of ADAM12 & 19 in both normal and glaucoma LC cells and TGFβ1 treated cells.

Conclusion: Our results demonstrate that transfection of glaucoma LC cells with miR29b controls the proliferation of the ECM proteins, ADAM 12 & 19, even in the presence of the profibrotic cytokine, TGFβ1. This suggests that miR-29b may represent a potential future therapeutic target for the prevention of fibrotic transformation at the lamina cribrosa in glaucoma.

P1.58
Resolution of hypotony related peripapillary retinoschisis in a glaucoma patient with normalization of intraocular pressure

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Purpose: The aim is to report an unusual case of peripapillary retinoschisis (PPRS) associated with ocular hypotony after glaucoma surgery.

Methods: Examination of the parient with OCT angiography.

Results: A 78-year-old man and with primary open angle glaucoma developed PPRS while hypotonous. Optical coherence tomography of the peripapillary and the macular area of the right eye revealed PPRS temporally and nasally to optic disk, more prominent at the level of the outer nuclear layer and less so at the inner nuclear layer. The PPRS completely regressed after one month with treatment and restoration of IOP to normal levels.

Conclusion: PPRS in glaucoma patients may present in the setting of ocular hypotony and appears to resolve when the hypotony is successfully managed. This case report indicates that hydrostatic pressure gradient across retinal vasculature that allows movement of fluid into the extracellular spaces is a potential mechanism for development of PPRS

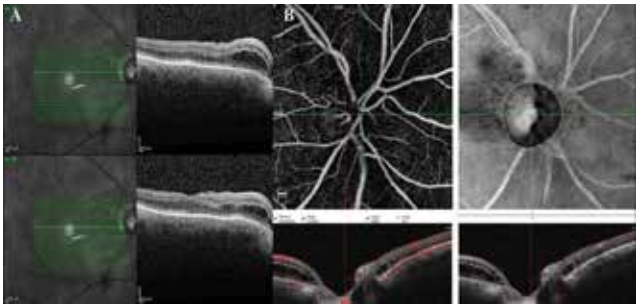

Figure 1. A = OCT of the peripapillary area (top) shows retinoschisis at the level of the outer nuclear layer and to a smaller degree the inner nuclear layer. The retinoschisis does not extend to involve the fovea (bottom). B = OCT angiography of the optic disc (left) and retina (right) confirms the absence of peripapillary or macular neovascularization in the retina or the choroid. Structural OCT B-scan shows peripapillary schisis involving both the temporal and the nasal retina around the optic disc.

P1.59
Generation of human retinal ganglion cells for glaucoma disease modeling

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Purpose: With the purpose of generating human retinal ganglion cells (RGCs) for glaucoma disease modeling and personalized medicine, we studied the differentiation of RGCs in retinal organoids derived from human embryonic stem cells (hES) and induced pluripotent stem cells (iPSCs).

Methods: We followed the protocol to generate human retinal organoids as described by Quinn et al. (2018; Methods Mol Biol 1715, 261-273), with minor modifications. Briefly, hES (H9) and iPSC (CARIM001A) cells were cultured in a 96 wells plate to form embryoid bodies (EB), starting from differentiation day 0 (DD0). Next, EBs were cultured individually in separate wells to form neuroepithelium, in neural induction medium, to which BMP4 was added. Developing optic cups were mechanically isolated and further differentiated into retinal organoids. At DD50, retinoic acid (RA) was added to the culture medium for half of the organoids. Development of RGCs was studied by harvesting organoids at various time points from DD41 to DD86. Organoids were fixed and cryostate sections were stained for BRN3A, ISLET1, RBPMS and Thy-1 (CD90).

Results: The protocol resulted in the formation of optic cups which could be isolated and differentiated into laminated retinal organoids. Abundant staining for ISLET1, an early maker of retinal interneurons and RGCs, was detected in the inner aspect

of the organoids already at DD41 and remained present until DD86. Staining for the early RGC marker BRN3A was detected from DD50 onwards and was restricted to the inner layer of the organoid. Clear staining for the more mature RGC marker RBPMS was observed in this inner layer from DD58 onwards. Thy-1 immunoreactivity was also present in this layer. Organoids generated from iPSC (CARIM001A) cell line showed a similar pattern of immunoreactivity. Addition of RA did not result in a clear difference in RGC marker immunocytochemistry.

Conclusion: BRN3A and RBPMS staining indicated that RGCs develop in the retinal organoids generated with the current protocol. Thy-1 immunoreactivity suggests that isolation and purification of RGCs using anti-Thy-1 magnetics beads will be feasible.

P1.60
Changes in blood flows in the central retinal artery secondary to IOP reduction in open angle glaucoma measured by Holographic Doppler

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Purpose: Holographic Doppler is an innovative, non-invasive imaging technique that provides dynamic images of retinal vessels and quantifies the velocity of blood flows. In this pilot study we aimed to analyze the influence of intraocular pressure (IOP) on blood flows in the central retinal artery (CRA) in patients with chronic open-angle glaucoma (OAG) using Holographic Doppler.

Methods: Four patients with OAG and ocular hypertonia greater than or equal to 30 mmHg were enrolled. The velocity of blood flows in the CRA was measured before and after surgical lowering of IOP. The velocity of blood flows was measured using Holographic Doppler. Peak systolic velocity (PSV), tele diastolic velocity (TDV), resistivity index (RI), and area under the curve (AUC) were calculated and compared for each patient by paired Student's T-Test.

Results: Patients included were male with a mean age of 75.5 ± 10.1 years. Glaucoma stage was severe in half of the patients. Acquisitions were performed between 1 and 14 days after surgery. A postoperative decrease of IOP (-25.25 ± 5.85 mmHg) was associated with an improvement of CRA diastolic flows, TDV increased by +101.35 ± 48.39% (p = 0.027) and RI decreased by -22.57 ± 7.41% (p = 0.001). AUC (+21.96 ± 18.44%) and PSV (-11.06 ± 10.27%) showed no significant change.

Conclusion: Holographic Doppler provided an accurate and reproducible measurement of the velocity of blood flows in the CRA. Reducing IOP in patients with OAG significantly improved diastolic flows in the CRA whereas systolic flows do not seem modified. Further studies involving higher number of patients are needed to confirm the interest of Holographic Doppler in measuring optic nerve head blood flow.

P1.61
he role of AMP-related kinase 5 (ARK 5) inhibition in human glaucomatous lamina cribrosa cells

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Purpose: Glaucoma, the leading cause of blindness globally is a chronic optic neuropathy characterised by structural changes in the lamina cribrosa, leading to a progressive retinal ganglion cells death and irreversible vision impairment and blindness. AMPK related kinase 5 (ARK5) is a member of the AMPK class of serine/threonine protein kinases that play an important role in cellular energy metabolism. The aims of this study were to examine the differential expression of ARK5 in glaucoma LC fibroblasts, to examine the effects of the known ARK5 inhibitors HTH-01-015 and miR-211 on TGF-β1 induced ARK5 expression in LC cells.

Methods: LC cells from three glaucomatous (GLC) donor eyes and 3 normal (NLC) age-matched controls were cultured. Using HiPerFect transfection reagent, cell transfection was performed using 5nM of miR-211 mimic or non-targeting mimic control. SiGLO transfection indicator was used to analyse efficiency. Post- transfection, a cohort of cells were stimulated with TGF-β1 (10ng/ml for 24 hours). ARK5, miR-211 and extracellular matrix (ECM) gene expression levels were measured in normal and glaucoma LC cells using qRT-PCR.

Results: ARK5 expression was significantly elevated in GLC cells compared to NLC cells ($p < 0.05$). TGFβ1 significantly increased ARK5 expression in the NLC and GLC cells. Treatment with 1μM HTH-01-015 significantly downregulated ARK5 and ECM gene expression in GLC cells versus untreated GLC cells. There was no significant difference between miR-211 levels in NLC versus GLC cells. TGFβ1 significantly reduced expression of miR-211 in NLC and GLC cells. Transfection with miR-211 increased miR-211 levels and reduced ARK5 levels in LC cells treated with TGFβ-1. Transfection with miR-211 mimic prevented an increase of ARK5 levels in NLC and GLC cells treated with TGFβ-1.

Conclusion: ARK5 inhibition using HTH-01-015 and miR-211 reduces ECM gene expression. Halting the pro-fibrotic activity and metabolism of GLC cells by downregulating ARK5 expression is an exciting new therapeutic approach for glaucoma.

P1.62
Primary open-angle glaucoma patients have reduced systemic mitochondrial function compared to healthy controls

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Purpose: Glaucoma is the leading cause of irreversible blindness worldwide with intraocular pressure (IOP) reduction being the only therapeutic approach shown to slow its progression.

However, many patients deteriorate despite best treatment, suggesting other factors confer susceptibility. Various studies, including work from our group, have indicated a link between glaucoma pathogenesis and mitochondrial dysfunction. Here we present data showing an association between systemic mitochondrial dysfunction and primary open angle glaucoma.

Methods: Mitochondrial function (expressed as oxygen consumption rate; OCR pmol/min/100,000 cells), was measured in lymphocytes using the Seahorse XFe24 Analyzer on 49 Controls, 69 high tension glaucoma (HTG) and 95 normal tension glaucoma (NTG) white-European, age similar subjects. Glaucoma participants had a minimum of 3 years follow up. Controls had absence of glaucomatous optic neuropathy, IOP < 21 mmHg and no family history of glaucoma in a first degree relative. Exclusion criteria: secondary or narrow angle glaucoma, active haematological malignancy, recent infection, chemotherapy, radiotherapy, and drugs potentially affecting mitochondrial function.

Results: Demographic data of the groups are presented in Table 1. A one-way ANOVA with post hoc Bonferroni corrections for multiple comparisons was conducted to compare mitochondrial function parameters (mean Basal, ATP-linked, Maximal and Reserve OCR) between the three groups. There was a significant reduction in all parameters of mitochondrial function in both the NTG and HTG cohorts as compared to Controls. Basal and ATP linked OCR were also significantly lower in the NTG cohort compared to the HTG group (Fig. 1).

Conclusion: Our data show lower systemic mitochondrial function in POAG patients. Mitochondrial dysfunction is worse in NTG patients, further supporting the role of the mitochondrial 'metabolic signature' as a useful biomarker for glaucoma and potential therapeutic target.

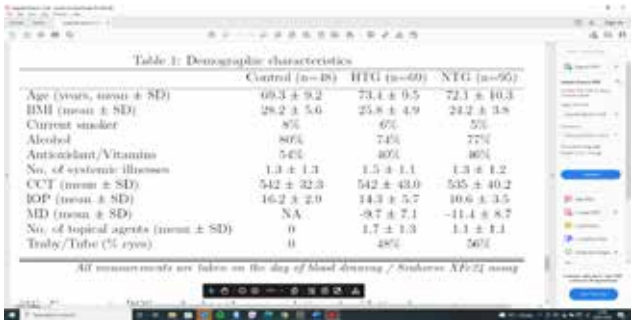

Table 1: Demographic characteristics

	Control (n=49)	HTG (n=69)	NTG (n=95)
Age (years, mean ± SD)	69.3 ± 9.2	73.1 ± 9.5	72.3 ± 10.3
BMI (mean ± SD)	28.2 ± 5.6	25.8 ± 4.9	24.2 ± 3.8
Current smoker	8%	6%	5%
Alcohol	80%	74%	77%
Antioxidant/Vitamins	54%	40%	46%
No. of systemic illnesses	1.3 ± 1.3	1.5 ± 1.1	1.3 ± 1.2
CCT (mean ± SD)	542 ± 32.3	542 ± 43.0	535 ± 40.2
IOP (mean ± SD)	16.2 ± 2.0	14.3 ± 5.7	10.6 ± 3.5
MD (mean ± SD)	NA	-9.7 ± 7.1	-11.4 ± 8.7
No. of topical agents (mean ± SD)	0	1.7 ± 1.3	1.1 ± 1.1
Trab/Tube (% eyes)	0	48%	56%

All measurements are taken on the day of blood drawing / Seahorse XFe24 assay

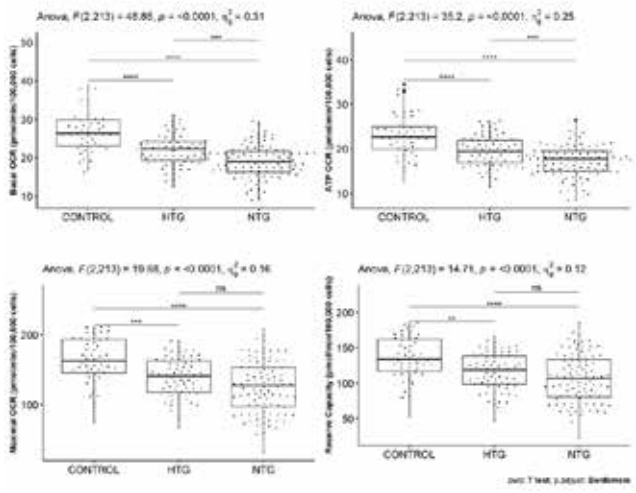

Figure 1. Mitochondrial function parameters of the three cohorts.

P1.63
Autotaxin in the lamina cribrosa: a driver of fibrosis in glaucoma

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Purpose: Fibrosis has been shown to be central to the pathogenesis of glaucoma, with disturbed extracellular matrix deposition and remodelling observed in both the trabecular meshwork and in the lamina cribrosa (LC) of the optic nerve head. Retinal ganglion cell axons degenerate in this disrupted architecture of the LC. The lysophosphatidic acid (LPA) axis has gained recent attention as a therapeutic target in fibrosis. LPA is predominantly synthesised by autotaxin, an enzyme that has been shown to be upregulated in in the trabecular meshwork in glaucoma as well as pulmonary fibrosis and cancer. LPA is known to act on six G-protein coupled receptors to activate intracellular signalling pathways that promote cell proliferation, migration and cell survival. In this study, we wished to determine the role of autotaxin and LPA in fibrotic changes observed in the LC in glaucoma.

Methods: LC cells were cultured from age-matched glaucoma and normal patient donors (N = 3, p = 1). Quantitative real-time PCR was used to determine expression of autotaxin and LPA receptors in glaucoma LC cells compared to normal. Glaucoma LC cells were treated with an autotaxin inhibitor S32826 and changes in expression of fibrosis genes (collagen I and fibronectin) subsequently assessed.

Results: Expression of LPA receptors was increased in glaucoma compared to normal LC cells. Autotaxin expression was significantly increased in glaucoma LC cells ($p < 0.05$). Treatment of glaucoma LC cells with 1 uM S32826 significantly decreased expression of collagen I ($p < 0.001$) and fibronectin ($p < 0.01$), which were over-expressed in glaucoma cells compared to normal.

Conclusion: There appears to be a role for autotaxin and LPA signalling in the regulation of LC associated fibrosis in glaucoma. Autotaxin represents a potential pharmacological target for fibrosis in glaucoma.

P1.64
Paired analysis of mitochondrial DNA variants in primary open angle glaucoma: the role of somatically acquired mutations

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Purpose: This study analysed next-generation sequencing of mtDNA from leucocytes and ocular fibroblasts to differentiate the role of germline and somatic mtDNA mutations in the aetiology of primary open angle glaucoma (POAG).

Methods: Caucasian POAG patients and disease-negative controls were recruited and underwent DNA extraction from blood leucocytes. In a subset, Tenon's ocular fibroblasts (TFs) were harvested at the time of ocular surgery, cultured and DNA was extracted. The mitochondrial genome was amplified in two

overlapping fragments (9289bp and 7626bp) by long-range PCR and underwent massively-parallel sequencing. Variant annotation and heteroplasmy levels were analysed using mtDNA-Server. The pathological impact of the non-synonymous variants were assessed using the predictor MitImpact 32 3.0.1 (http://mitimpact.css-mendel.it/) and the meta predictor classification engine APOGEE to determine pathogenicity.

Results: 123 POAG patients' and 95 control patients' blood samples were collected in whom 38 POAG and 19 controls had paired TFs extracted. The analysis of mtDNA variants in blood alone and TFs alone demonstrated no differences in the haplogroup distribution, regional distribution of all variants (including pathogenic) and number of transitions/transversions between glaucoma and controls. Individual evaluation of the mtDNA in these samples demonstrated higher levels of heteroplasmy in novel non-synonymous pathogenic coding and tRNA mtDNA variants in POAG compared to controls. A significantly higher number of homoplastic pathogenic variants were found in glaucoma TFs compared to controls ($p = 0.0477$). Specific analysis of the pathogenic variants demonstrated a significant increase in the glaucoma somatic TFs non synonymous pathogenic variants compared to germline glaucoma variants samples alone ($p < 0.001$), but not in the control cohort.

Conclusion: A paired analysis of blood and TFs from the same patient allows for consideration of somatic mtDNA mutations and was a unique approach in evaluating mitochondrial genetics in glaucoma. The increase in somatic pathogenic mitochondrial mutations in POAG subjects compared to controls supports the role of somatic mtDNA mutations [1] in the aetiology of glaucoma.

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P1.65
A connection between serum levels of HSP 70 and parameters of structural and functional glaucoma damage

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Purpose: Heat shock proteins (HSPs) are involved in the pathogenesis of glaucoma neuropathy, caused by increased IOP. To determine the serum concentration of HSP 70 in patients with primary open-angle glaucoma with increased intraocular pressure (POAG-HTG) and patients with pseudoexfoliative open-angle glaucoma, and to investigate the relationship between this biomarker and the degree of disease.

Methods: This study examined 90 serum samples; 37 samples of patients suffering from primary open-angle glaucoma with elevated intraocular pressure (POAG-HTG), 24 samples of patients with open angle pseudoexfoliative glaucoma (XFG) and 29 samples of respondents with senile cataract (CAT). The concentration of circulating HSP 70 was measured by ELISA in the plasma of the subjects.

Results: The average value of serum HSP 70 of all subjects was 2.21 ± 1.41 ng/ml, with a median of 2.04 ng/ml, and the range from 0.18 to 6.55 ng/ml. Serum values of HSP 70 were very similar in all three groups of subjects (POAG-HTG 2.27 ± 1.70 ng/ml, PEXG 2.14 ± 0.96 ng/ml, cataract 2.20 ± 1.32 ng/ml), and neither the Kruskal-Wallis, nor the Mann-Whitney test found statistically significant differences between the examined patients. There was a statistically significant negative correlation between the serum concentration of HSP 70 and RNFL Sup ($p < 0.05$). In the whole sample of glaucoma patients, there were statistically significant negative correlations of serum HSP 70 concentrations with MD, RNFL Avg, RNFL Sup and RNFL Inf ($p < 0.05$). Serum HSP 70 concentration is a factor that statistically significantly affects visual field MD, RNFL Avg, RNFL Sup and RNFL Inf patients with POAG-HTG. An increase in HSP 70 per unit of measure causes in patients with POAG-HTG a significant decrease in MD by 1.37 with a confidence interval of 0.01 ± 2.73, as well as a decrease in RNFL Avg, RNFL Sup and RNFL Inf.

Conclusion: This study showed that the HSP 70 serum concentration may be a measure of the development and progression of glaucoma neuropathy in POAG-HTG. Also, HSP 70 can be a significant biomarker of glaucoma.

P1.66
Pseudophakic pupillary block

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Purpose: Describe a case of pupillary block in a pseudophakic patient secondary to synechiae between the iris and the intraocular lens (IOL) implanted in the capsular bag.

Methods: 60-year-old woman with severe diabetic retinopathy and cataract in her right eye (RE). Phacoemulsification + hydrophobic monofocal IOL in capsular bag was decided. The next day, we found a hemovitreous in RE, observation was decided after performing ultrasound. As the condition did not resolve, a pars plana vitrectomy was performed. 17 days after the second surgery, the patient presented intense pain in her RE, visual acuity was hand motion, IOP 70 mmHg, intense corneal edema, iris bombe, wide chamber, narrow in the periphery. Correct pseudophakia. Irregular pupil with mild non-reactive miosis. Closed angle. Topical hypotensive drugs, oral acetazolamide, and IV mannitol were prescribed without response. Peripheral iridotomies were performed with good response. Mydriatics are added to force pupillary dilation,

Results: The next day she presented an IOP 10. One month after the iridotomies she presented an IOP 12 and AV of 0.6.

Conclusion: Pseudophakic pupillary blocks rarely occur with current phacoemulsification techniques and capsular bag IOL implantation. Complications inherent to surgery and patients (glaucoma, diabetes, children, previous early surgery) that predispose to a greater inflammatory context may be associated with the potential development of synechiae between the iris and the anterior IOL / capsule, preventing the correct flow of the aqueous humor due to the pupillary block. In a study of the type of IOL in a uveitic context, a greater association was found with hydrophobic IOL than with other types. The location where the IOL is implanted is also related, being greater in the IOL in the anterior chamber or sulcus. Peripheral YAG laser iriditomies are a good therapeutic option but are not recommended intraoperatively because they can cause more complications than benefits.

P1.67
Neovascular glaucoma due to ocular ischemia syndrome. Case report and differential diagnosis

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Purpose: To evaluate an ocular ischemia syndrome (IOS) in a patient with neovascular glaucoma and diabetic retinopathy.

Methods: Metabolic, immunologic and inflammatory diseases research involved in the etiology of ocular ischemic syndrome

Results: A 68-year-old patient with moderate non-proliferative diabetic retinopathy (NPDR) in both eyes, ischemic heart disease and peripheral arterial disease consulted for pain and visual acuity (VA) decrease in his Left Eye (LE). On the examination, he presented marked rubeosis iridis not present in previous controls. The IOP was 18 mmHg and gonioscopy revealed a sealed 360º angle. On the following days, IOP increases to 34 mmHg. The right eye (RE) didn't show rubeosis and the IOP was 14 mmHg. On fundus examination he presented moderate NPDR, and fluorescein angiography (FAG) showed extensive retinal ischemia with neovascularization (NV) in both eyes. A phacoemulsification, vitrectomy, panphotocoagulation and implantation of Ahmed valve in LE was performed. After surgery he presented hypotension that was managed conservatively. No choroidal detachment was observed. As the patient showed an asymmetry of his diabetic retinopathy it was suspected an IOS. An ECO-Doppler showed a bilateral 30% carotid stenosis. The RE showed an increasing IOP and rubeosis, so it received the same surgical management. A systematic study with antibodies, cranial and aortic Computed Tomography Angiography (CTA) was performed to evaluate secondary causes of ocular ischemia, such as arteriopathies and vasculitis. It was confirmed a bilateral carotid occlusion despite non-significant stenosis. Although significant carotid stenosis is described as greater than 70%, a diminished collateral circulation may increase the risk of IOS in cases in which carotid stenosis has lower values. Development of neovascular glaucoma (NGV) occurs in 68% of the patients, and sometimes a normal or low IOP can be observed due to a hypoperfusion of the ciliary body. Moreover, IOS often coexists with the underlying DM. In these patients, asymmetry of ischemic signs between both eyes should be studied with a carotid echo-doppler.

Conclusion: IOS may be the first carotid stenosis manifestation. Its early diagnosis is vital to avoid complications that can cause irreversible visual loss and ischemic events in the central nervous system

P1.68
Secondary intraocular hypertension due to increased episcleral venous pressure - different etiologies and pathophysiological mechanisms

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Purpose: An increase in episcleral venous pressure (EVP) can cause secondary intraocular hypertension. It may be idiopathic or associated with systemic pathologies, trauma, hobbies. The purpose of this paper is to present different clinical cases that highlight the differential diagnosis and the pathophysiological mechanisms of increased EVP.

Methods: Case 1 - 46 years-old female with eyelid edema, proptosis, and red left eye (LE). History of unsucceeded endovascular treatment to a left facial arteriovenous malformation (AVM). Case 2 - 46 years-old male with right eye (RE) retrobulbar pain and proptosis with ocular retropulsion resistance. History of head trauma 2 months earlier and subsequent endovascular treatment for a right carotid-cavernous fistula (CCF). Cases 3 - 19 years-old male with LE unilateral glaucoma under topical therapy and valvular-implant; 33 years-old male with RE proptosis and buphthalmos. Case 4 - 24 years-old male with history of seven surgeries due to facial and oral AVM.

Results: Case 1 - Left facial cutaneous angiomatosis. LE biomicroscopy showed dilated conjunctival and episcleral vessels, with visible blood in Schlemm canal through gonioscopy. Intraocular pressure (IOP) was 18 RE and 30 LE mmHg. MRI-scan revealed left facial and orbital AVM, with ophthalmic and angular veins engorgement. Case 2 - RE conjunctival chemosis and profuse episcleral injection. IOP of 38 RE and 14 LE mmHg. Retinal nerve fibre layer loss was documented. Placement of flow-diverter stent was performed due to CCF persistence. Cases 3 -Facial nevus flammeus and LE choroidal hemangioma. IOP of 17 RE and 19 LE mmHg; Second case presented right facial nevus flammeus and bilateral diffuse choroidal hemangioma. IOP of 36 RE and 23 LE mmHg. Both cases suggestive of Sturge-Weber syndrome. Case 4 - LE conjunctival vascular malformations. IOP of 13 RE and 14 LE mmHg. LE fundus revealed dilated tortuous vessels with arteriovenous communications and racemose distribution in all retinal quadrants. Head MRI-scan showed left intracranial and orbital (intraconal and extraconal components) AVM, suggesting Wyburn-Mason syndrome.

Conclusion: The clinical cases here presented underline the role of ophthalmologists in the diagnosis of life-threatening pathologies (such as CCF) and in IOP control to avoid visual degeneration.

P1.69
Regulation of lysyl oxidase-like protein 1 by microRNAs in pseudoexfoliation glaucoma

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Purpose: Lysyl oxidase-like protein 1 (LOXL1) gene has a role in pseudoexfoliation syndrome (XFS), but the exact regulatory mechanism of this gene for pseudoexfoliation glaucoma (XFG) at molecular level is not known. Therefore, present study investigates the role of miRNAs that regulate LOXL1 gene in pseudoexfoliation glaucoma along with difference in miRNA expression pattern between XFS, cataract and XFG patients.

Methods: Patients were recruited from Glaucoma and Lens clinic of Advance Eye Centre, PGIMER, Chandigarh, India. Informed consent was obtained from each patient after complete description of the study. Patients were grouped in three groups: Group 1: patients diagnosed as pseudoexfoliation syndrome (XFS) Group 2: patients with pseudoexfoliation glaucoma (XFG) Group 3: age and sex matched unrelated patients with cataract who underwent cataract surgery. Total of 43 patients in different groups were recruited. 3 samples (RNA from anterior lens capsule) from each group were send for sequencing and the rest of samples were used for miRNA and gene expression studies. Bioinformatic tools ScanMir and TargetScan software were used to identify miRNAs and screened for their LOXL1 mRNA specificity. Seven miRNAs, LOXL1 and elastin were selected for validation in anterior lens capsule by real time PCR.

Transcriptome sequencing was also performed. GO and KEGG pathway enrichment analysis of these genes showed their involvement in Extracellular matrix receptor interaction (ECM) in XFS Vs XFG samples.

Results: miR-125b and miR-296 showed significant upregulation in XFG whereas miR–185 showed significant downregulation in XFG samples. Also, LOXL1 and Elastin expression were checked in the same sample by real time PCR. The expression of elastin was increased significantly in XFG patients.

Conclusion: Our study showed that there is a list of genes regulated by miRNAs that are involved in ECM receptor regulation in pseudoexfoliation glaucoma. Hence, ECM disturbed regulation could be the cause of pseudoexfoliation.

P1.70
Optic nerve head changes in eyes treated with multiple intravitreal injections

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Purpose: To evaluate the changes in optic nerve head structures evaluated by spectral domain optical coherence tomography (SD-OCT), among patients receiving multiple intravitreal injections (IVi) of vascular endothelial growth factor inhibitors (VEGFi).

Methods: All patients followed in the Retina department for wet-type age related macular degeneration, between 2020 and 2022, and who met the following criteria, were selected: submitted to more than 5 IVi in one eye; never been submitted to IVi in the fellow eye; no history of glaucoma, ocular hypertension or use of topical ocular hypotensive medication; no history regarding other diseases of the retina or optic nerve. We retrospectively reviewed SD-OCT measurements regarding average retinal nerve fiber layer thickness (avRNFL), average retinal nerve fiber layer thickness by quadrants, rim area (RA), disc area (DA), average cup to disc ratio (avCDR), vertical cup to disc ratio (vCDR) and cup volume (CV), from optic nerve heads. Measurements were compared before and after treatment, and fellow eyes were used as a control group.

Results: 36 patients met the inclusion criteria. A median of 12 IVi were administered (minimum: 6; maximum: 24). No statistically significant differences were found between the measurements of the two groups before treatment. When comparing groups before and after treatment, a statistically significant decrease of avRNFL (M = -3.23µm, SD = 1,05µm, t (25) = 3.0, p =.006), superior quadrant RNFL (M = -4.92µm, SD = 1,71µm, t (25) = 2.9, p =.008), inferior quadrant RNFL (M = -4.77µm, SD = 2,09µm, t (25) = 2.3, p =.03) and RA (Mdn (IQR) = -0,05µm (0.09), Z = -2.84, p =.004), as well a statistically significant increase of avCDR (Mdn (IQR) = 0,03µm (0,03), Z = -3.91, p <.001) was observed in the eyes submitted IVi treatment. No differences were observed in control group. No statistical correlation between the number of IVi and the changes of the aforementioned parameters was found.

Conclusion: In this retrospective cohort, eyes submitted to multiple IVi showed structural optic nerve head changes similar to those seen in glaucoma. This could be associated with transient ocular hypertension or the loss of neuroprotective effect of VEGF, but although it has been previously reported in literature, other studies have failed to demonstrate correlation. Our cohort seems to corroborate a possible association, but bigger prospective studies are lacking to address this issue.

P1.71
Comparison of machine learning approaches for focal visual field modelling

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Purpose: To compare focal visual field (VF) modelling using different machine learning approaches with retinal nerve fiber layer (RNFL) thickness measurements in subjects with primary open angle glaucoma (POAG).

Methods: Asian Chinese participants from Singapore and Caucasian participants from Romania, all with POAG, underwent optical coherence tomography imaging (OCT) and 24-2 VF testing. Stratified sampling using glaucoma severity was used to select 20% of the Singapore data as an internal test set, while the data from Romania was used to construct an independent external test set. For each of the 52 VF test locations, machine learning models based on gradient boosted trees (GBT), support vector machines (SVM), convolutional neural nets (CNN) and elastic-net regression (ENR) were trained to predict focal VF deviation values from the circumpapillary RNFL measurements. Mean average errors (MAE) of the predictions against the measured VF values were calculated. Differences in MAE were evaluated using Friedman's test and post-hoc analysis was conducted using Nemenyi's test for multiple comparisons.

Results: 721 glaucoma eyes of 506 Asian Chinese participants and 111 glaucoma eyes of 63 Caucasian participants were included. In the internal test set, the average mean deviation (MD) was -4.79 ± 5.79 dB and was not significantly different (p =.118) from the external test set (-5.85 ± 5.05 dB). However, there were significant differences in the age, refractive error and mean RNFL thickness (p <.05). Between the machine learning models, there were significant differences in the MAE (p <.001) on both internal and external datasets. GBT achieved an overall MAE of 4.44 dB (inter quartile range (IQR):3.45-5.17) on the internal test set and 3.87 dB (3.64-4.22) on the external test set. Post-hoc analysis showed that GBT had significantly lower MAE than CNN and ENR (p <.001). MAE of GBT was lower than that of SVR but the differences were not significant in both internal (p =.859) and external datasets (p =.900).

Conclusion: Prediction of focal visual field values using different machine learning models were evaluated on an internal and independent external data set. The results suggest that GBT may be viable for structure-function modelling and further studies are needed to assess the potential of this approach.

P1.72
he discriminative ability of two glaucoma diagnostic calculators in glaucoma suspects and glaucoma patients

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Purpose: Glaucoma diagnosis is still based on ophthalmic examination and visual field interpretation. Several structural parameters from the optic nerve and the macular area measured by optical coherence tomography (OCT), and the combination of some of them, have shown noteworthy diagnostic performance. We aimed to validate the discriminative ability of two already published OCT-based diagnostic calculators (RETICs) and to compare it with that of isolated OCT parameters.

Methods: We revised the medical charts of 76 primary open-angle glaucoma (A), 107 glaucoma suspects (B), and 67 healthy control cases (C). Demographics, data from reliable visual fields, and high-quality OCT disc and macular parameters were included. The reference diagnosis (clinical examination) was compared against the probability of having glaucoma obtained from the two RETICs glaucoma diagnosis calculators (GDCs). Both GDC1 and 2 derived from multivariate logistic regressions using either only the numeric (quantitative) data from peripapillary retinal nerve fiber layer (pRNFL), optic disc, and ganglion cell-inner plexiform layer (GCIPL) (calculator 2) or along with qualitative data (color scoring of the quantitative data according to a normative database) (calculator 1). The sensitivity and specificity of all parameters were analyzed. Areas Under the Receiver operating characteristic curves (AUROC) were compared in A and B for both calculators, and the best OCT parameters.

Results: The three best OCT parameters in terms of AUROC for both A and B were inferior pRNFL (0.931; 0.760), average pRNFL (0.925; 0.745), and minimum GCIPL (0.919; 0.735), showing no statistically significant differences among them. The AUROCs from both calculators 1 and 2 were high (0.949 & 0.943, p = 0.61) and moderate (0.739 & 0.73, p = 0.56) for A and B, respectively; compared to the OCT-derived parameters, their discriminative ability was modestly superior. Calculator 2 was able to correctly classify 46.9% and 14.7% more cases compared to calculator 1.

Conclusion: the combination of OCT parameters provided by the RETICs calculators had the highest diagnostic ability to discriminate glaucoma vs control eyes, although it was not as good when evaluating glaucoma suspects. Calculator 2 had the best results, suggesting that adding qualitative structural information does not improve glaucoma diagnosis performance.

P1.73
Reversible mitochondrial injury in dying retinal ganglion cells

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Purpose: Glaucoma is a neurodegenerative disease in which various triggers induce cascades of secondary events, which ultimately lead to retinal ganglion cell (RGC) death. Once started, the cell death program is generally considered to be irreversible. However, recent studies reveal that recovery of dying cells is possible, even after reaching critical events in the cell death program. This phenomenon is termed anastasis. Harnessing mechanisms of anastasis may represent a previously unrecognized therapeutic strategy to rescue dying differentiated cells that are difficult to replace. We study neuronal cell death with the aim of rescuing dying RGCs in glaucoma.

Methods: Primary rat RGCs and differentiated PC12 cells were treated with ethanol to induce cell death. Live cell imaging with fluorescent probes (Mito-Tracker, TMRM, DCFDA, Fluo-8AM) were used to visualize the progression of the cell death program in individual RGCs and differentiated PC12 cells with high-resolution live-cell spinning disk confocal microscopy. Electron microscopy (EM) was used to observe the ultrastructure of mitochondria. Immunostaining was used to detect cytochrome c translocation.

Results: Exposure to 5% ethanol for 24 h induced 80.7% ($p < 0.001$) and 69.1% ($p < 0.001$) cell death in RGCs and PC12 cells, respectively. In both cell lines, live cell imaging showed significant mitochondrial fragmentation and membrane potential loss after ethanol treatment for 3 h. The average length of mitochondria decreased from 7.2 ± 6.2 µm to 1.3 ± 0.3 µm in RGCs ($p < 0.0001$), and 6.1 ± 4.5 µm to 1.1 ± 0.12 µm in PC12 cells ($p < 0.0001$). Moreover, removal of ethanol and further culturing in fresh cell culture medium for 20 h restored normal mitochondrial structure (RGC, 6.1 ± 4.5 µm; PC12, 4.7 ± 3.7 µm) and membrane potential. EM results confirmed the ethanol induced mitochondrial fragmentation and its reversibility. In addition, during the mitochondrial fragmentation cells showed higher levels of reactive oxygen species ($p < 0.001$) and intracellular Ca^{2+} ($p < 0.001$). However, immunostaining showed that no cytochrome c release from mitochondria at this stage of reversible mitochondrial injury.

Conclusion: The results indicated that targeting and harnessing mitochondria may hold promise as therapeutic strategy to rescue dying RGCs in glaucoma and reduce its vision loss.

P1.74
Intraocular pressure changes during yoga exercises in young healthy adults

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Purpose: Various yoga positions may have an unfavorable impact on the IOP and can therefore be seen as a potential risk factor for the development of ocular disorders such as glaucoma. The new 'iCare HOME 2' is a handheld self-tonometer for IOP measurements outside of clinical settings. This is the first study to evaluate the effect of common yoga postures on the IOP of healthy adults using an 'iCare HOME 2' self-tonometer.

Methods: We included 21 healthy participants performing four yoga positions (Fig. 1) for 90 seconds each. The IOP of the right eye was measured before, during and after every position using an 'iCare HOME 2' self-tonometer. We computed and tested changes of IOP during exercise. Second, we analysed differences of IOP before an exercise and after recovery. We also assessed whether IOP increases were more pronounced in the bend over and down face positions.

Results: IOP significantly increased in all positions. In the legs up position by 1.38 mmHg (SD 1.88; p = 0.003), during bend over by 14.19 mmHg (SD 4.65; p < 0.001), during the plow pose by 6.67

mmHg (SD 3.90; p < 0.001), and during the down face pose by 17.43 mmHg (SD 4.33, p < 0.001). The IOP did not fully recover after resting (+0.55 mmHg (SD 1.82; p = 0.007). IOP during the legs up and plow pose positions combined was 19.83 mmHg SD (4.52) and 30.33 mmHg SD (4.94) in the bend over and down face positions combined (p < 0.001). In the head-down positions the rise in IOP was 15.38 mmHg SD (4.44) compared to 4.14 mmHg SD (3.93) in the other two positions.

Conclusion: Our data show that yoga exercises can lead to higher IOP. Highest increases were seen in the down face position reaching mean IOP values beyond 30 mmHg. IOP values recovered but showed a small residual increase. The extent to which these findings lead to a conversion to glaucoma or apply to glaucoma patients, warrants further research.

legs up bend over plow pose down face

Figure 1. Four Yoga exercises (adapted from PLoS One 2015;10: e0144505).

P1.75
Increased risk of Alzheimer's disease in patients with normal tension glaucoma: a nationwide cohort study

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Purpose: Both normal tension glaucoma (NTG) and Alzheimer's disease (AD) are chronic, progressive neurodegenerative diseases with an age-related and female-predominant incidence. Our study aimed to investigate a possible association between NTG and an increased risk of developing AD through the Taiwan National Health Insurance Research Database in Taiwan.

Methods: We enrolled patients with NTG into the NTG group and a comparison group of 1:4 age- and gender-matched individuals from 2001 to 2013. Kaplan- Meier curves were used to compare the cumulative hazard of AD between the two groups. We performed a multivariable Cox regression analysis to estimate the adjusted hazard ratios (HRs) of AD, adjusted for diabetes, hypertension, hyperlipidaemia, coronary artery disease and stroke. Furthermore, risk factors for developing AD among the NTG group were investigated.

Results: A total of 15,317 patients NTG and 61,268 matched controls were enrolled in the study. The mean age of the cohort was 62.1 ± 12.5 years. Patients with NTG had significantly higher proportions of diabetes, hypertension, hyperlipidaemia, coronary artery disease, and a significantly higher cumulative incidence of AD. In the multivariable Cox regression after adjustment for confounders, the NTG group had a significantly higher risk of AD (adjusted HR = 1.52; 95% confidence interval [CI]: 1.41 - 1.63). As we compared the effects of different types of glaucoma eye drops in the NTG group, none of them were significant risk or protective factors for AD.

Conclusion: People with NTG are at a significantly higher risk of developing AD. Among patients with NTG, none of the glaucoma eye drops used significantly changed the risk of subsequent AD.

Table 1. Analysis of risk factors for AD in patients with and without NTG

Predictive variables	Multivariate analysis[1]	
	Adjusted HR (95% CI)	P value
NTG (Yes vs. No)	1.52 (1.41–1.63)	<0.0001
Age		
<55	Reference	
55-65	4.97 (3.95-6.24)	0.0002
65-75	17.33 (14.2-21.42)	<0.0001
³75	38.85 (31.43-48.02)	<0.0001
Gender (Male vs. Female)	0.92 (0.86-0.98)	0.01
Hypertension	1.07 (0.97-1.17)	0.17
Diabetes mellitus	1.05 (0.98-1.13)	0.20
Hyperlipidemia	1.01 (0.94-1.19)	0.79
Coronary artery disease	1.06 (0.99-1.14)	0.10
Stroke	1.73 (1.61-1.87)	<0.0001

[1] All the other variables in the table are included for adjustment.

P1.76
Association between retinitis pigmentosa and an increased risk of open angle glaucoma

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Purpose: Retinitis pigmentosa (RP), which is a disease of retinal hereditary dystrophy, can lead to blindness. Similarly, open angle glaucoma (OAG) is a genetic disorder. The similarities in genetic variants and pathophysiology between RP and OAG have been reported. We conducted the study to explore whether patients with RP have a significantly higher risk of OAG development.

Methods: We enrolled patients with RP into the RP group through the Taiwan National Health Insurance Research Database from 2001 to 2013; we included a comparison group of 1:4 age- and gender-matched individuals without RP and performed a Cox regression analysis to estimate the crude and adjusted hazard ratios (HRs) for OAG. Confounders adjusted in the Cox regression model were age, gender, hypertension, diabetes mellitus, hyperlipidaemia and chronic kidney disease.

Results: We enrolled 6,223 subjects with RP and 24,892 subjects for comparison. The mean age of the cohort was 49.0 ± 18.1 years. The RP group had significantly higher percentages of hypertension, diabetes mellitus and hyperlipidaemia. The cumulative incidence of OAG in patients with RP was 1.57%, which was significantly higher than that in the comparison group

(0.58%, p < 0.0001). The univariate Cox regression revealed that the hazard of OAG development was significantly greater in the RP group than in the comparison group (unadjusted HR = 2.86; 95% confidence interval [CI]:2.21–3.70). The increased risk persisted after adjusting for confounders (adjusted HR = 2.86; 95% CI: 2.21–3.70).

Conclusion: People with RP are at a significantly higher risk of developing OAG than individuals without RP.

Table 1. Analysis of Risk Factors for OAG in Patients with and without RP

Predictive variables	Multivariate analysis[1]	
	Adjusted HR (95% CI)	P value
RP (Yes vs. No)	2.83 (2.19–3.66)	<0.0001
Age		
<40	Reference	
40-60	1.74 (1.21–2.49)	<0.01
³60	2.45 (1.63–3.68)	<0.0001
Gender (Male vs. Female)	1.23 (0.95–1.58)	0.111
Hypertension	1.02 (0.74–1.40)	0.914
Diabetes mellitus	1.10 (0.79–1.53)	0.586
Hyperlipidemia	1.11 (0.82–1.51)	0.511
Chronic kidney disease	1.01 (0.66–1.60)	0.904

[1] All the other variables in the Table are included for adjustment.

Poster Session 2

Treatment - Medical | Epidemiology, Health Economics, Visual Disability, QoL | Follow up/Progression

P2.01 A new paradigm targeting two glaucoma therapy dilemmas
Anastasios G. Konstas[1], Konstadinos G. Boboridis[1], Georgios Athanasopoulos[1], Anna-Bettina Haidich[1], Irini C. Voudouragkaki[1], Eirini Pagkalidou[1], Andreas Katsanos[1], L. Jay Katz[2] *([1]Greece, [2]USA)*

P2.03 Responder rate and investigator/patient-reported assessment of efficacy and tolerability regarding the preservative-free tafluprost/timolol fixed-dose combination in the treatment of open-angle glaucoma and ocular hypertension: country-level analysis from the VISIONARY study
Gabor Hollo[1], James Kirwan[2], Fernando Lopez-Lopez[3], Marina Zimina[4], Claudia Fassari[5], Francesco Oddone[6] *([1]Hungary, [2]United Kingdom, [3]Spain, [4]Russian Federation, [5]Switzerland, [6]Italy)*

P2.04 Baseline intraocular pressure affects treatment outcome with the preservative-free tafluprost/timolol fixed-dose combination in open angle glaucoma and ocular hypertension: subanalysis from the VISIONARY study
Gabor Holló[1], James Kirwan[2], Fernando Lopez-Lopez[3], Marina Zimina[4], Claudia Fassari[5], Francesco Oddone[6] *([1]Hungary, [2]United Kingdom, [3]Spain, [4]Russian Federation, [5]Switzerland, [6]Italy)*

P2.05 Practice patterns for the treatment of glaucoma - Results from a survey among German ophthalmologists
Christian Wolfram, Alexander Schuster *(Germany)*

P2.06 Ultrasound ciliary plasty in glaucoma treatment: a long-term follow-up study
Bartlomiej Bolek, Adam Wylegala, Edward Wylegala *(Poland)*

P2.07 The protective role of fluvoxamine in fibrotic disorders of the eye
Minh Tran, Balázs Besztercei, Gyorgy Torok, Timea Medveczki, Illes Kovacs, Attila Szabo, Andrea Fekete, Judit Hodrea *(Hungary)*

P2.08 The impact of MF-438 on the latent inflammation induced by preservative-free prostaglandin analog eyedrops
Joanna Machowicz[1], Anna Pacwa[1], Alicja Wojtyniak[1], Marita Pietrucha-Dutczak[1], Elisa Toropainen[2], Ali Koskela[1], Ewa Mrukwa-Kominek[1], Joanna Lewin-Kowalik[1], Adrian Smedowski[1] *([1]Poland, [2]Finland)*

P2.09 Incidence and factors associated with brimonidine allergy
Pattawee Pongpisitkul, Sunee Chansangpetch, Kitiya Ratanawongphaibul, Rath Ittipanichpong, Anita Manassakorn, Visanee Tantisevi, Prin Rojanapongpun *(Thailand)*

P2.10 Patient adherence to glaucoma medication in glaucoma virtual clinic
Su Ling Young, Kelvin Cheng, Andrew Tatham *(United Kingdom)*

P2.11 Correlating symptomatic ocular surface disease with clinical signs in glaucoma patients on chronic intraocular pressure lowering eyedrops
Fiona Pin Miao Lim, Catherine Willshire, Rupert Bourne *(United Kingdom)*

P2.12 Anterior segment optical coherence tomography for tear meniscus evaluation and its correlation with number of glaucoma medications
Lidija Magarasevic, Isidora Janicijevic, Milos Plavsic *(Serbia)*

P2.13 Aqueous misdirection post phaco-trab: AS-OCT imaging and successful management
Miguel Leitão, Francisco Alves, Guilherme Almeida *(Portugal)*

P2.14 Effects of erythropoietin on neuroprotection in an experimental glaucoma model
Tolga Kocaturk, Yusuf Onay, Sinan Bekmez, Serhan Camoglu, Kemal Ergin *(Turkey)*

P2.15 Functional analysis of glia cells in RGC using coculture system
Ji-Ae Ko, Akira Minamoto, Kaori Komatsu, Hideaki Okumichi, Yoshiaki Kiuchi *(Japan)*

P2.16 Evaluation of neuroprotective and immunomodulatory properties of mesenchymal stem cells in an ex-vivo retinal explant model
Juliette Buffault, Reboussin Elodie, Brignole-Baudouin Françoise, Réaux-Le Goazigo Annabelle, Mélik-Parsadaniantz Stéphane, Christophe Baudouin *(France)*

P2.18 In vitro evaluation of sodium hyaluronate protective effect against benzalkonium chloride
María Silvia Passerini, Florencia Sabbione, Alexia Vereertbrugghen, Melina Sol del Papa, Jeremias Galletti *(Argentina)*

P2.19 Intraoperative OCT-assisted ophtalmic surgeries and it´s novel use in open angle glaucoma surgery: cases report
Jose Manuel Rodriguez Perez, Brenda Alegría García Loza *(Mexico)*

P2.20 Bimatoprost implant effects on 24-hour intraocular pressure
Miriam Kolko[1], Robert Weinreb[2], William C. Christie[2], Felipe Medeiros[2], Randy Craven[2], Kimmie Kim[2], Ashley Nguyen[2], David Wirta[2] *([1]Denmark, [2]USA)*

P2.21 Efficacy and drug tolerability of preservative-free latanoprost-timolol fixed combination in glaucoma and ocular hypertension patients with existing ocular surface disease switched from the preserved prostaglandin analog-timolol fixed combinations
Sonja Jandrokovic, Sania Vidas Pauk, Dina Lešin Gacina, Ivan Škegro, Martina Tomic *(Croatia)*

P2.22 The effect of antiglaucomatous drugs on central corneal thickness in patients with primary open-angle glaucoma: 5-year results of 1152 patients. Retroprospective study
Mehmet Tahir Eski, Taha Sezer *(Turkey)*

P2.23 Extended duration of IOP lowering with bimatoprost implant in a phase 3 clinical trials study extension
Andrew Tatham[1], Felipe Medeiros[2], W. Daniel Stamer Stamer[2], Saumya Nagar[2], Marina Bejanian[2], Suzanne Zheng[2], Michael R. Robinson[2], David Wirta[2] *([1]United Kingdom, [2]USA)*

P2.24 Wound healing response after minimally invasive glaucoma surgery in the rabbit
Ralph van Mechelen[1], Marjolein Verhesen-Herfs[1], Marion Gijbels[1], Christian Bertens[1], Leonard Pinchuk[2], Theo Gorgels[1], Henny Beckers[1] *([1]The Netherlands, [2]USA)*

P2.25 The influence of anti-hypertensive eye drops and preservatives in the ocular surface of primary open-angle glaucoma patients
André Ferreira, Ana Marta, João Heitor Marques, Catarina Castro, Diana José, Paulo Sousa, Isabel Neves, Maria João Menéres, Irene Barbosa *(Portugal)*

P2.26 Magnesium supplementation does not influence circumpapillary vessel density in normal-tension glaucoma
Lukas Hoeflechner[1], Thomas Falb[1], Laura Posch-Pertl[1], Katharina Valentin[1], Marlene Lindner[1], Bujar Berisha[1], Leopold Schmetterer[1,2,3], Gernot Steinwender[1], Domagoj Ivastinovic[1], Nairz Manfred[1], Stephanie Sarny[1], Wolfgang List[1], Ewald Lindner[1] *([1]Austria, [2]Singapore, [3]Switzerland)*

P2.27 The effect of metformin on glaucoma lamina cribrosa cells
Daire Hurley, Sophia Millington-Ward, Mustapha Irnaten, Gwyneth Jane Farrar, Colm O'Brien *(Ireland)*

P2.28 Two-year results from a European Study of a supraciliary glaucoma drainage device in patients with open angle glaucoma
Philippe Denis[1], Christoph Hirneiß[2], Julian Garcia Feijoo[3], Florent Aptel[2], Burkhard Dick[2], Norbert Pfeiffer[2] *([1]France, [2]Germany, [3]Spain)*

P2.29 Eye surface status after therapeutic switch from bimatoprost 0.1 mg/ml with benzalkonium chloride or bimatoprost 0.3 mg/ml preservative-free to a new bimatoprost 0.1 mg/ml preservative-free: an observational study
Mariaelena Filippelli, Nicola Ciampa, Roberta Giannini, Gaetano Fioretto, Pier Franco Marino, Roberto dell'Omo, Giuseppe Campagna, Ciro Costagliola *(Italy)*

P2.31 Efficacy and tolerability of netarsudil 0.02%/latanoprost 0.005% compared with bimatoprost 0.03%/timolol 0.5% in patients with open-angle glaucoma or ocular hypertension: findings from the MERCURY 3 study
Ingeborg Stalmans[1], Gabor Holló[2], Anton Hommer[3], Jose I. Belda[4], Francesco Oddone[5] on behalf of the MERCURY 3 Study Group *([1]Belgium, [2]Hungary, [3]Austria, [4]Spain, [5]Italy)*

P2.32 Preliminary results of a new long-tube glaucoma drainage device made from innovative materials: a short-term rabbit study
Christian Bertens, Ralph van Mechelen, Leonard Pinchuk, Jan de Boer, Jaap den Toonder, Henny Beckers *(The Netherlands)*

P2.33 Management of uveitic glaucoma in South East of Serbia
Jasmina Djordjevic-Jocic, Predrag Jovanovic, Marija Trenkic, Sonja Cekic, Maja Zivkovic, Marija Radenkovic *(Serbia)*

P2.35 Multiple surgical approach to ICE syndrome: report of an unexpected event
Jacobo Herrera Pereiro, Laura Guerrero Altares, José Javier San Román Llorens *(Spain)*

P2.36 Traumatic hyphema and angle recession without glaucomatous optic neuropathy: a case report
Alejandro Pardo Aranda, Laura Sánchez Vela, Marta Garrido Marín, Rafael Fischer, Manuel Antonio Amilburu Pérez, Olivia Pujol Carreras[1], Jaume Rigo Quera, Marta Castany, Antonio Dou Sáenz de Vizmanos *(Spain)*

P2.37 Peculiarity of the glaucoma care in Ukraine
Zoya Veselovskaya, Natalia Veselovskaya, Inna Zaporozhchenko *(Ukraine)*

P2.38 Psychological aspects related to glaucoma in a developing country
Farah Akhtar, Madiha Aruj, Mahmood Ali *(Pakistan)*

P2.39 Prescription burden of antiglaucoma drugs in a developing country
Farah Akhtar, Mahmood, Muhammad Sadiq *(Pakistan)*

P2.40 Under-registration of visual impairment in glaucoma patients: why aren't we doing enough?
Omar Mostafa, Onyinye Akpenyi, Jaishree Gandhewar *(United Kingdom)*

P2.41 Influence of pharmacological group in adherence to glaucoma medications in a wide population
Ignacio Pereira Gonzalez, Javier Benitez-del-Castillo Sanchez, Soledad Jimenez-Carmona, Juan Antonio Cordoba Doña *(Spain)*

P2.42 Influence of preservatives and dose-format in adherence to glaucoma medications in a wide population
Javier Benitez-del-Castillo Sanchez, Ignacio Pereira Gonzalez, Soledad Jimenez-Carmona, Juan Antonio Cordoba Doña *(Spain)*

P2.43 Prevalence of ocular hypertension/secondary glaucoma in uveitis
Irene Temblador-Barba, Javier Benitez-del-Castillo Sanchez, Alejo Rodriguez-Suarez, Alfredo Michan-Doña *(Spain)*

P2.44 The recruitment process of an epidemiology study amidst the COVID19 pandemic: experience, challenges, learning points and preliminary data on glaucoma epidemiology
David Agius, Xeniya Fedoryak, Julian Mamo, Francis Carbonaro *(Malta)*

P2.45 Publication and outcome reporting bias based on the registration status in glaucoma surgical trials: a systematic review
Reinemary Michael, Andrew Toren, Cape Leila, Hui Xin Zhang *(Canada)*

P2.46 Eliciting preferences in glaucoma management - a systematic review of stated-preference studies
Lotte M.J. Scheres, Mickaël Hiligsmann, Brigitte Essers, Henny Beckers *(The Netherlands)*

P2.47 Impact of minimally invasive glaucoma surgery on the ocular surface and quality of life in patients with glaucoma
Lee Jones, Natalia Maes, Umair Qidwai, Gokulan Ratnarajan *(United Kingdom)*

P2.48 Glaucoma clinical research: trends in treatment strategies and drug development
Thuy Linh Tran, Line Storgaard, Josefine Clement Freiberg, Alexander Hauser, Miriam Kolko *(Denmark)*

P2.49 Correlation between iris color and glaucoma type
Marija Bozic, Ivan Marjanovic, Vesna Maric *(Serbia)*

P2.50 An audit to assess if our patients with glaucoma have informed the driving and vehicle licensing agency
Michelle Dinsdale, Hussameddin Muntasser, Anshoo Choudhary *(United Kingdom)*

P2.51 Factors associated with corneal hysteresis in an elderly population: the Thessaloniki Eye Study
Rodanthi Christina Bartzoulianou[1], Anne L. Coleman[2], Alon Harris[2], M. Roy Wilson[2], Anna-Bettina Haidich[1], Theofanis Pappas[1], Dimitrios Giannoulis[1], Fei Yu[2], Anastasia Raptou[1], Grigoria Tzoanou[1], Fotis Topouzis[1] *([1]Greece, [2]USA)*

P2.52 Remote decision-making: the outcomes of a shifting paradigm
Diogo Matos, Rafael Correia Barão, Patrícia José, Miguel Santos, Rui Ferreira, André Diogo Barata, Luis Abegão Pinto *(Portugal)*

P2.53 The performance of vertical cup-disc ratio on glaucoma diagnosis in a prevalence survey
Angeliki Salonikiou[1], Anne L. Coleman[2], M. Roy Wilson[2], Alon Harris[2], Panayiota Founti[1,3], Vassileios Kilintzis[1], Eleftherios Anastasopoulos[1], Fei Yu[2], Theofanis Pappas[1], Fotis Topouzis[1] *([1]Greece, [2]USA, [3]United Kingdom)*

P2.54 Sociodemographic characteristics of glaucoma patients and quality of life in glaucoma
Gizem Sayar Bilgin, Serife Bayraktar, Belgin Izgi *(Turkey)*

P2.55 Quality of life in patients requiring treatment for glaucoma and ocular hypertension: a time trade-off study
Atika Safitri[1], Evgenia Konstantakopoulou[1,2], Kuang Hu[1], Gus Gazzard[1] *([1]United Kingdom, [2]Greece)*

P2.56 Dietary nitrate intake is associated with decreased incidence of open-angle glaucoma
Joëlle Vergroesen[1], Tosca de Crom[1], Lauren Blekkenhorst[2], Trudy Voortman[1], Caroline Klaver[1,3], Wishal Ramdas[1] *([1]The Netherlands, [2]Australia, [3]Switzerland)*

P2.57 Assessment of the impact of an add-on and its smartphone application on the daily management of glaucoma: a pilot study
Alice Bodeveix, Jean-Baptiste Dériot, Emmanuelle Albertini *(France)*

P2.58 Cost-utility of trabecular bypass at the time of cataract surgery in a universal, single-payer health care system
Alp Atik[1], Eamonn Fahy[2] *([1]Australia, [2]United Kingdom)*

P2.60 IOP elevation after intravitreal injections with Ozurdex
Alberto Chierigo, Carlo Alberto Cutolo, Donatella Musetti, Raffaella Rosa, Massimo Nicolò, Carlo Traverso *(Italy)*

P2.61 Secondary glaucoma in patients with familial amyloid polyneuropathy in Cyprus
Katia Papastavrou, Brian Gilbert Vinh, Eleni Papanicolaou Zamba, Theodoros Kyriakides, Theodoros Potamitis *(Cyprus)*

P2.62 Teaching home tonometry using a remote video link
Catriona Barbour-Hastie, Andrew Tatham *(United Kingdom)*

P2.63 A retrospective study to assess visual field improvement following augmented trabeculectomy
Clarissa Ern Hui Fang, Mohamad Tawfeek Hakim, Mubashir Siddiqui, Deborah Armstrong, Vikas Shankar *(United Kingdom)*

P2.64 Glaucoma app as a tool for improvement of patients compliance
Zhamilya Sangilbayeva, Neilya Aldasheva *(Kazakhstan)*

P2.65 Early detection of rapid glaucoma progression in elderly patients: a retrospective clinical study on 474 patients
Sidi Mohammed Ezzouhairi, Leila Naciri, Roula Jomaa *(Morocco)*

P2.66 Use of a novel diagnostics sign-posting tool to streamline glaucoma virtual reviews
Binita Panchasara, Daniel Porter, Arnav Srivastava, Akil Kanani, Jason Chan, Lydia Chang *(United Kingdom)*

P2.67 Effect of repeated intravitreal injections in glaucoma spectrum diseases
Rodrigo Vilares-Morgado[1], Vera Correia[1], Ana Filipa Moleiro[1], Flávio Alves[1], Antonio Melo[1], Sérgio Silva[1], Joana Rodrigues Araújo[1], João Tavares-Ferreira[1], Marta Silva[1], Amândio Rocha-Sousa[1], Ângela Carneiro[1], João Barbosa Breda[1,2] *([1]Portugal, [2]Belgium)*

P2.68 Concordance of intraocular pressure values obtained with the iCare HOME 2 and Goldmann applanation tonometry in healthy subjects
Josephine Wachtl, Darja Shajiei, Angelika Schuknecht, Lucas Bachmann, Christoph Kniestedt *(Switzerland)*

P2.69 Ocular surface disease in virtual glaucoma clinic patients
Su Ling Young, Kelvin Cheng, Sarah Donaldson, Tej Rane-Malcolm, Andrew Tatham *(United Kingdom)*

P2.70 Multiple MIGS: a retrospective comparative study
Mohammed Abu-Bakra, Abdus Samad Ansari *(United Kingdom)*

P2.71 Long-term follow-up for patients with primary congenital glaucoma in Latvia
Eva Elksne, Arturs Ozolins, Sandra Valeina *(Latvia)*

P2.72 Association between vascular and structural parameters by optical coherence tomography angiography in primary congenital glaucoma
Laura Morales-Fernandez, Cristina Ginés Gallego, Pilar Pérez García, José María Martínez-De-La-Casa, Julian Garcia Feijoo *(Spain)*

P2.73 Macular and peripapillary angio OCT in subjects affected by chronic open angle glaucoma with localized perimetric damage
Massimo Savastano *(Italy)*

P2.74 The forgotten follow up
Stefan Stefanov *(Bulgaria)*

P2.75 Glaucoma risk prediction in ocular hypertension (GRIP): a real world data study using electronic medical records to validate a risk predictor for conversion to glaucoma
Augusto Azuara-Blanco[1], on Behalf of the GRIP study group GRIP *(United Kingdom)*

P2.76 Comparison of iCare home rebound tonometry and clinic intraocular pressure measurement
Jasna Pavicic-Astalos, Emmanuel Ankamah, Rachel Taheny, Eugene Ng *(Ireland)*

P2.77 Macular capillary perfusion density and macular vessel density in open angle glaucoma and ocular hypertension: a longitudinal study
Maria del Mar Schilt-Catafal, Vicente T. Pérez-Torregrosa, Antonio M. Duch-Samper *(Spain)*

P2.78 Pigmentary open-angle glaucoma in Leber's hereditary optic neuropathy: case report
Mariana Portela, Marta Correia, Margarida Baptista, João Costa, Maria Patricio *(Portugal)*

P2.79 Ab-interno canaloplasty standalone versus combined with cataract surgery - 36-month outcomes in 1000+ eyes
Mahmoud Khaimi *(USA)*

P2.80 Plasma rich in growth factors as an adjuvant agent in non-penetrating deep sclerectomy
Pedro Pablo Rodriguez-Calvo, Ignacio Rodriguez-Una, Montserrat García, Hector Gonzalez-Iglesias, Andres Fernandez-Vega-Cueto, Jesus Merayo-Lloves *(Spain)*

P2.81 Intra-ocular pressure response to dexamethasone implant injections in patients with a history of filtering surgery: the TRABEX study
Amina Rezkallah, Philippe Denis, Kodjikian Laurent, Mathis Thibaud *(France)*

P2.82 Changing prevalence of glaucoma-related vision loss in Europe over the last 20 years: findings from the Global Vision Database of the Vision Loss Expert Group
Rupert Bourne[1], Jost Jonas[2], Alain Bron[3], Jaimie Steinmetz[4], Paul Briant[4], Tabassom Sedighi[1], Nicolas Leveziel[3], Maria Cicinelli[5], Luca Rossetti[5], Ian Tapply[1], Serge Resnikoff[6], Theo Vos[4], Hugh Taylor[6] *([1]United Kingdom, [2]Germany, [3]France, [4]USA, [5]Italy, [6]Australia)*

P2.83 Glaucoma conversion of the contralateral eye in unilateral normal-tension glaucoma patients: a 5-year follow-up study
Jin-Soo Kim, Hyuk Jin Choi, Ki Ho Park *(South Korea)*

P2.84 Intraocular pressure fluctuation and rates of visual field progression in primary open-angle glaucoma: an exploratory analysis from the United Kingdom Glaucoma Treatment Study (UKGTS)
Alessandro Rabiolo, Giovanni Montesano, David Crabb, David Garway-Heath *(United Kingdom)*

P2.01
A new paradigm targeting two glaucoma therapy dilemmas

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Purpose: To investigate whether switching glaucoma patients on triple preserved therapy to equivalent triple preservative-free (PF) therapy with either placebo, or topical cyclosporine 0.1% administered once in the evening will improve glaucoma therapy-related ocular surface disease (GTR-OSD) and diurnal intraocular pressure (IOP) control.
Methods: A single-center, masked, prospective, placebo-controlled, crossover trial of 41 well-controlled open-angle glaucoma subjects with moderate to severe GTR-OSD on preserved latanoprost and dorzolamide/timolol fixed combination (DTFC) therapy was conducted. Subjects were randomized to receive PF tafluprost and DTFC with either placebo or cyclosporine 0.1% drops once in in the evening for 6 months and were then crossed over to the opposite therapy. Oxford score of ocular staining was the primary outcome; osmolarity, matrix-metalloproteinase-9 (MMP-9) testing, tear film break-up time (TFBUT), meibomian gland dysfunction (MGD) rate, punctum evaluation, adverse events and diurnal IOP comprised secondary outcomes.

Results: GTR-OSD findings improved with PF therapy. At 6 months the triple PF with placebo group showed improvement compared to baseline in mean Oxford score (mean difference [MD]: -3.76; 95% confidence interval [CI]:-4.74 to -2.77; $p < 0.001$), osmolarity (MD: -21.93; 95% CI:-27.61 to -16.24 mOsm/l; $p < 0.001$), punctum stenosis ($p = 0.008$) and conjunctival hyperaemia ($p < 0.001$). Similar improvements occurred in the cyclosporine 0.1% enhanced period, which also provided greater improvement in MMP-9 positivity (24% vs 66%;$p < 0.001$) and TFBUT ($p = 0.022$). The cyclosporine 0.1% group was superior versus placebo in mean Oxford score (MD: -0.78; 95%CI:-1.40 to -0.15); $p < 0.001$), itchiness and objective adverse events rate ($p = 0.034$). Cyclosporine 0.1% elicited more stinging vs placebo (63% vs 24%;$p < 0.001$). Both PF regimens reduced mean diurnal IOP more than preserved therapy (14.7 vs 15.9 mmHg; $p < 0.001$).

Conclusion: Changing from preserved to PF glaucoma medications improves ocular surface health and IOP control. Topical cyclosporine 0.1% further reverses GTR-OSD.

P2.03
Responder rate and investigator/patient-reported assessment of efficacy and tolerability regarding the preservative-free tafluprost/timolol fixed-dose combination in the treatment of open-angle glaucoma and ocular hypertension: country-level analysis from the VISIONARY study

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Purpose: Analysis of country-level data from the VISIONARY study to examine responder rate and investigator- and patient-reported assessment of treatment outcome in adults with open-angle glaucoma (OAG) and ocular hypertension (OHT) following a switch to the topical preservative-free tafluprost (0.0015%) and timolol (0.5%) fixed-dose combination (PF tafluprost/timolol FC) from beta-blocker or prostaglandin analogue (PGA) monotherapy.[1]

Methods: Country-level data were analyzed from a European, prospective, observational study of adults with OAG/OHT insufficiently treated with beta-blocker/PGA monotherapy. Patients were followed up at Week 4, Week 12 and Month 6 after PF tafluprost/timolol FC initiation. Country data were examined where results were available for ≥ 20 patients (Italy, Hungary, Spain, Russia, the UK and Latvia). Exploratory endpoints included the percentage of patients demonstrating intraocular pressure (IOP) reductions from baseline of ≥ 20% ≥ 25%, ≥ 30% and ≥ 35% at Month 6. Investigator assessments of treatment efficacy and compliance and patient-reported tolerability data were reported by country.

Results: Following initiation of PF tafluprost/timolol FC, IOP was significantly reduced from baseline (under monotherapy) in all countries at Week 4 through Month 6 ($p < 0.0001$). The percentage of patients demonstrating ≥ 20% IOP reductions from baseline at Month 6 ranged from 61.5% (UK) to 94.1% (Latvia). Between 46.1% (UK) and 78.4% (Latvia) showed IOP reductions ≥ 25%. Between 35.4% (Hungary) and 45.1% (Latvia) showed IOP reductions ≥ 30%, while 18.5% (Spain) to 31.0% (Russia) demonstrated reductions ≥35%. At Month 6, most investigators in each country (78.8–96.1%) considered IOP control more effective with PF tafluprost/timolol FC than with prior monotherapy. Patient compliance was considered better/equal to prior treatment in each country (98.7–100%). Patient-reported tolerability with PF tafluprost/timolol FC therapy was typically good/very good at Month 6 (85.7–100%).

Conclusion: Patients included in the VISIONARY study from Hungary, Italy, Latvia, Russia, Spain and the UK demonstrated significant IOP reduction on PF tafluprost/timolol FC therapy compared to prior monotherapy; this was present from Week 4 through Month 6. Most patients in each country achieved IOP reductions of at least 20%, and most investigators considered PF tafluprost/timolol FC therapy more effective than prior monotherapy. Both treatment compliance and patient-reported tolerability were high in all study countries.

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P2.04
Baseline intraocular pressure affects treatment outcome with the preservative-free tafluprost/timolol fixed-dose combination in open angle glaucoma and ocular hypertension: subanalysis from the VISIONARY study

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Purpose: Randomized controlled trials indicate that baseline intraocular pressure (IOP) is predictive of IOP lowering with topical fixed-dose combination therapies in open-angle glaucoma (OAG) and ocular hypertension (OHT) [1]. The current subanalysis of data from the VISIONARY study examined the relationship between baseline IOP and IOP-lowering outcomes with the fixed-dose combination of preservative-free tafluprost (0.0015%) and timolol (0.5%) (PF tafluprost/timolol FC) in a real-world clinical practice setting [2].

Methods:
Adult patients with OAG/OHT, insufficiently treated with a topical beta-blocker or prostaglandin analogue (PGA) monotherapy were included in a European prospective multicenter observational study. Treatment at baseline was changed to QD PF tafluprost/timolol FC, and the change in mean (standard deviation [SD]) IOP was investigated at Week 4, Week 12 and Month 6. Subanalysis of stratified baseline IOP (<15, 15–19 and ≥20 mmHg) was performed.

Results: The subanalysis included 577 patients. Participants in both the 15-19 and ≥ 20 mmHg pre-switch IOP subgroups demonstrated significant IOP reductions from baseline at Week 4 and during the 6-month study period ($p < 0.0001$). Patients in the < 15 mmHg subgroup showed significant IOP reductions at Week 12 only ($p = 0.0196$). IOP reduction from baseline in the ≥ 20 mmHg subgroup was 6.6 (3.61), 7.1 (3.74) and 7.1 (3.73) mmHg at Week 4, Week 12 and Month 6, respectively, corresponding to relative changes of 27.3%, 29.5% and 29.6% from baseline. Respective IOP reductions at Week 4, Week 12 and Month 6 were 3.0 (2.02), 3.3 (1.95) and 2.8 (2.82) mmHg in the 15–19 mmHg subgroup, corresponding to relative changes of 16.9%, 18.7% and 15.8% from baseline. The < 15 mmHg subgroup showed mean reductions of 0.8 (2.58), 0.9 (2.04) and 0.6 (2.24) mmHg at Week 4, Week 12 and Month 6, respectively, representing reductions of 6.5%, 6.4% and 3.8% from baseline.

Conclusion: In OAG/OHT patients with baseline IOP ≥ 15 mmHg under monotherapy, a switch to PF tafluprost/timolol FC resulted in a significant IOP reduction at Week 4 that was sustained throughout the 6-month study period. In the current subanalysis of the VISIONARY study the highest reduction in IOP was seen in those with baseline under monotherapy pressures ≥ 20 mmHg.

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P2.05
Practice patterns for the treatment of glaucoma - Results from a survey among German ophthalmologists

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Purpose: We performed a survey among the members of the German Ophthalmological Society (DOG) and the Professional Association of Ophthalmologists in Germany (BVA) to explore treatment patterns, therapeutic strategies and the role of glaucoma surgery.

Methods: Our survey was conducted by using an online questionnaire that consisted of 26 questions (107 items) about the treatment practice for diagnosis and treatment of glaucoma. The members were invited by email. Fully completed questionnaires were available from 1,361 participants.

Results: When comparing different interventional treatments for glaucoma trabeculectomy gains the highest ranking as a meaningful treatment procedure, followed by minimally invasive glaucoma surgery (MIGS) and selective lasertrabeculoplasty (SLT). SLT is however the most commonly performed procedure. 84.8 percent of responders define a target pressure regularly. A systemic therapeutic approach is conducted by 44.9 percent. Two thirds of the responders consider side effects of conservative treatment to affect quality of life, even though they are mostly considered to be mild. Most common side effects of topical treatment are conjunctival hyperemia and burning. Non-adherence is estimated to occur on average in 32 percent of patients. Approx. 5-10 percent of glaucoma patients are treated surgically. 58.4 percent of respondents were familiar with the EGS treatment guidelines.

Conclusion: With a large number of participants our survey provides a comprehensive overview over current patterns of glaucoma care in Germany. There is a consensus to define a target pressure in glaucoma treatment, yet therapeutic approaches and strategies in glaucoma care are quite diverse. The choice of therapy should harmonize effective reduction of IOP with the patients' preferences and feasibility of intervention. There is a demand and need for more standardizations of care that should be addressed in further education and training.

P2.06
Ultrasound ciliary plasty in glaucoma treatment: a long-term follow-up study

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Purpose: The present study aimed to evaluate the efficacy and safety of ultrasound ciliary plasty (UCP) procedure in patients with open-angle glaucoma for 3 consecutive years.

Methods: Forty-one patients with primary and secondary refractory glaucoma were enrolled to undergo UCP. The primary outcome measures were intraocular pressure reduction, success rates, glaucoma medication use, and visual acuity after UCP. Secondary outcome measures included intraoperative and postoperative complications. Measurements were performed preoperatively and at 1 week, and 1, 3, 6, 12, 18, 24, 30 and 36 months postoperatively.

Results: The mean ± SD values of IOP preoperatively and at 1 week, and 1, 3, 6, 12, 18, 24, 30 and 36 months postoperatively were 22.8 ± 4.9, 16.0 ± 4.6, 18.6 ± 4.6, 17.4 ± 3.8, 17.0 ± 3.1, 16. 7 ± 2.7, 16.4 ± 2.9, 15.8 ± 3.4, 15.3 ± 2.2 and 16.3 ± 3.2 mmHg ($p < 0.001$ for all values), respectively. The mean IOP at the last follow-up was reduced by 28.3%. The decrease in IOP and number of antiglaucoma medications was statistically significant. Choroid detachment was observed in three patients (7.3%), while macular edema was observed in three patients (7.3%) after the procedure. No other major intraoperative or postoperative complications occurred.

Conclusion: UCP seems to be an effective and well-tolerated method to reduce IOP in patients with refractory glaucoma.

P2.07
The protective role of fluvoxamine in fibrotic disorders of the eye

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Purpose: Transforming growth factor-beta2 (TGF-Đ2) is strongly associated with the development of elevated intraocular pressure and primary open-angle glaucoma. It plays an important role in the extracellular matrix production and induction of fibrogenic changes in trabecular meshwork cells [1]. Recently, we proved that fluvoxamine (FLU), a specific Sigma-1 receptor agonist, is antifibrotic in the kidney. Here we investigated the effects of FLU on the fibrotic response induced by TGFĐ2 in cultured human trabecular meshwork (hTM) cells and in mice anterior segment (AS).

Methods: C57BL/6J mice were injected with TGFĐ2 intracamerally and then the AS were stained with Phalloidin and visualized with confocal microscopy. In vitro experiments with hTM included MTT (3-[4,5-dimethylthiazol-2-yl]-2,5 diphenyl tetrazolium bromide) assay, Phalloidin staining, and Western blotting to investigate cell proliferation, cytoskeleton rearrangement and the expression of fibrosis-related markers on TGFβ2-treated hTM cells in the presence or absence of FLU.

Results: The F actin enhencement was observed upon TGF-β2 treatment in vivo. In vitro TGF-β2 induced cytoskeletal rearrangement with F-actin bundles and clumps formation (mean fluorescence increased 109.49%) and that was reduced by FLU (50.07%). TGFβ2 also stimulated hTM cells proliferation with 17.49% compared to controls and upon FLU treatment it was reduced with 17.10%. The profibrotic protein levels of connective tissue growth factor, fibronectin, collagen type IV, and alpha-smooth muscle actin were elevated by TGF-β2 treatment (with 342.8%, 147.38%, 364.39%, and 147.38%, respectively) and all these fibrosis elements were suppressed by FLU with 33.51–45.49%. Treatment with TGF-β2 reduced the expression of Matrix Metallopeptidase-2 (52.75%) and this effect was inhibited when TGF-β2 was combined with FLU (91.98%).

Conclusion: FLU may usefully reduce the fibrotic response of trabecular meshwork and could be a potential candidate for the treatment of fibrosis-induced ocular hypertension.

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P2.08
The impact of MF-438 on the latent inflammation induced by preservative-free prostaglandin analog eyedrops

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Purpose: Chronic topical glaucoma treatment may induce latent inflammation within ocular adnexa. The aim was to evaluate the effect of Stearoyl-CoA desaturase-1 inhibitor (MF-438) on the differentiation of monocytes exposed to saturated fatty acid derivatives from eye drops.

Methods: The culture of human peripheral blood monocytes was exposed to eye drops containing the detergents being fatty acid derivatives, i.e. Monoprost (hydroxystearate macrogolglycerol – MGHS40), Taflotan (polysorbate 80 - PS80), Monoprost+MF-438, MGHS40 or PS80 alone. The appropriate concentrations of excipients were determined by LDH-based cell viability assay for concentrations 0.1-0.5%. As negative control C (-), monocytes cultured in basal medium were used, as positive controls - monocytes stimulated by LPS and IFNĐ (M1-macrophages) or IL-4 (M2- macrophages). The cells were cultured for 8 days, the medium was changed every 3 days. The concentration of SCD1 was determined by ELISA using cell homogenates. The number and differentiation of cells was assesed from 5 visual fields under microscope in each well at 20x magnification.

Results: The concentration of SCD1 (ng/ml) was: 7.8 ± 0.3 - Monoprost; 1.5 ± 0.4 - Taflotan; 6.8 ± 0.7 - MGHS40; 0.4 ± 0.002 - PS80; 0.9 ± 0.02 - Monoprost+MF-438; 5.4 ± 1.6 - C (-); 0.5 ± 0.04 - M1; 2.2 ± 0.13 - M2. The % of macrophages in the culture was: 33.6%; 17.6%; 33%; 0%; 13.5%; 18.6%; 36.3%; 39.3% for Monoprost, Taflotan, MGHS40, PS80, Monoprost+MF-438, C (-), M1, M2; respectively. There was strong correlation between SCD1 concentration and presence of macrophages in culture: $r = 0.9$, $p < 0.05$.

Conclusion: Inhibition of SCD1 in monocytes prevents their transformation into macrophages after exposition to saturated fatty acids derivatives contained in the eye drops, which may contribute to the inhibition of latent inflammation within ocular adnexa.

P2.09
Incidence and factors associated with brimonidine allergy

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Purpose: To evaluate the incidence of brimonidine allergy and factors associated with brimonidine allergy. The clinical characteristics and management of brimonidine allergy were also described.

Methods: A retrospective chart review of 2,850 patients who used brimonidine at King Chulalongkorn Memorial Hospital during 2019 to 2020 was conducted. The subjects were divided into 2 groups including brimonidine allergic and non-allergic group. Demographic and clinical variables were collected and compared between the 2 groups.

Results: Incidence of brimonidine allergy was 5.5% (157 of 2,850 patients). The onset of allergic signs and symptoms ranged from 15 to 72 weeks with a median of 32 weeks. Multivariable logistic regression analysis showed that brimonidine allergy was associated with history of topical antiglaucoma medication allergy (OR = 54.03, 95%CI 3.99-731.63, p = 0.003), concurrent topical steroid (OR = 0.31, 95%CI 0.11-0.84, p = 0.022), concurrent artificial tear (OR = 2.57, 95%CI 1.40-4.73, p = 0.002), brimonidine dosage (OR = 2.78, 95%CI 1.31-5.92, p = 0.008) and the duration of brimonidine use (OR = 0.99, 95%CI 0.98-0.99, p < 0.001). The patients mostly experienced red eye (73.8%) and itching (50.0%). Discontinuation of brimonidine was done mostly (98.7%). Their symptoms and signs improved after a median of 5.5 weeks of treatment.

Conclusion: Approximately 5.5% of brimonidine users developed brimonidine allergy, which typically manifested at 32 weeks. Allergy to topical antiglaucoma medications, concurrent artificial tear use, and twice daily brimonidine use increased the risk of brimonidine allergy, whereas concomitant use of topical steroid lowered the risk. The chance of getting brimonidine allergy decreased with time.

P2.10
Patient adherence to glaucoma medication in glaucoma virtual clinic

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Purpose: Glaucoma patients often remain on long term medical treatment and compliance rates may vary. Suboptimal adherence to treatment has been associated with worse visual fields. With increasing drive towards virtual glaucoma clinics where there is no face-to-face doctor-patient interaction, non-adherence may result in unnecessary additional medications and/or interventions. We aimed to assess patient adherence to glaucoma medications in a virtual glaucoma clinic.

Methods: 100 consecutive patients attending the virtual glaucoma clinic were enrolled in this prospective cohort study from January 2021 to December 2021. Visual field (VF) testing was carried out in all patients and glaucoma severity was defined by the VF mean deviation (MD) in the worse eye. All patients were invited to complete a modified Medications Adherence Questionnaire which comprises of 9 questions. Complete data from 74 patients who completed the questionnaire were included in analysis. The questionnaire was scored from 0 to 9. A score of 9 was defined as high adherence, a score between 7 and 9 moderate adherence and a score of less than 7 low adherence.

Results: The average age of patients was 73.2 years old, with average MD of the worse eye of -5.94 dB. The average duration of follow up from first diagnosis was 8.32 years (Interquartile Range [IQR] 4.25 -11.29 years). On average patients were using 1.4 glaucoma medications. 17 (20%) patients were using preservative free formulations. 92% of patients report self-administering their glaucoma medication. 49 patients (67%) had scored 9 indicating high adherence. There was no statistical significance when comparing the relationship between adherence and age, number of medications, worst MD and duration of follow-up.

Conclusion: There is a good level of medication adherence among our virtual glaucoma clinic patients. This may be secondary to milder severity of glaucoma in our cohort and consequently, lower number of glaucoma medications. Further research should examine objective measures of adherence and factors influencing adherence in greater detail.

P2.11
Correlating symptomatic ocular surface disease with clinical signs in glaucoma patients on chronic intraocular pressure lowering eyedrops

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Purpose: To examine whether glaucoma patients who are chronically treated with intraocular pressure lowering drops and who have symptoms of ocular surface disease have a different constellation of clinically detectable ocular surface signs than those who are asymptomatic

Methods: Patients with primary open angle glaucoma or ocular hypertension taking at least one glaucoma eyedrop at Cambridge University Hospitals (CUH) NHS Foundation Trust and Hinchingbrooke Hospital were recruited from glaucoma clinics and underwent full glaucoma eye examination including mydriatic examination, visual fields and ocular imaging. Each patient completed an Ocular Surface Disease Index Questionnaire (OSDIQ) - a value of ≥20 was used to classify the ocular surface disease as symptomatic. Outcome measures included conjunctival hyperemia, tear break-up time, conjunctival and corneal staining (Oxford protocol), cornea aesthesiometry, Schirmer I test and tear film osmolarity. Only right eyes were reported in this analysis.

Results: Of 173 patients recruited, 60 had symptomatic ocular surface disease. Mean conjunctival staining score was significantly higher in symptomatic versus asymptomatic patients (0.85 versus 0.73 respectively, p = 0.049). Although mean corneal staining score was higher in symptomatic than asymptomatic patients (0.80 versus 0.77 respectively), it was not statistically significant (p = 0.62). Mean tear break-up time and average Schirmer I test were shorter in symptomatic patients versus asymptomatic patients but not statistically significant [6.44 versus 6.83 (p = 0.81) and 12.9 versus 13.8 (p = 0.63) respectively]. There were no significant differences in blepharitis severity, tear osmolarity, cornea aesthesiometry or conjunctival hyperaemia between both groups.

Conclusion: Mean conjunctival staining scores were higher in symptomatic versus asymptomatic glaucoma patients taking

glaucoma eyedrops, yet there existed considerable variability in this relationship. This has led on to development of a statistical model that correlates symptomatology to known risk factors such as frequency of drops, preservatives, and older age. This predictive model may assist clinicians in making decisions about intraocular pressure control options.

P2.12
Anterior segment optical coherence tomography for tear meniscus evaluation and its correlation with number of glaucoma medications

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Purpose: To evaluate tear meniscus with anterior segment optical coherence tomography and its correlation with number of antiglaucoma medications

Methods: In this prospective cross-sectional observational study, 45 eyes were studied. All the patients were divided into three groups:Group 1, 2,3 and 4 according to the number of glaucoma medications. Group 1on one glaucoma medication. Group 2 on two glaucoma medications,group 3 on three and in group 4 four glaucoma medications.All patients underwent routine ophthalmologic examinations and optical coherence tomography imaging of inferior tear meniscus height (TMH) and tear meniscus area (TMA)

Results: Initially 45 eyes were classified by glaucoma medications numbers in three groups. There was significant decrease in the all tear variables with the increase of glaucoma medications numbers. According to groups in group 1, TMH were 0.337mm and TMA were 0.029 mm². In group 2 TMH were 0.297 mm and TMA were 0.027mm². In group 3 TMH were 0.295 mm and TMA were 0.026mm². in group four TMA were 0.231 mm and TMA were 0.022 mm². We concluded that TMH and TMA decreases with the number of glaucoma medication especially in the group on three and four medications.

Conclusion: Conclusion Anterior Segment Optical Coherence Tomography for Tear Meniscus Evaluation can give us rapid and useful information of tear volume in glaucoma patients and can be of some help for planning glaucoma treatment.

P2.13
Aqueous misdirection post phaco-trab: AS-OCT imaging and successful management

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Purpose: To describe the case of an 82 year-old patient with aqueous misdirection after phaco-trab surgery, evaluated with AS-OCT imaging and successfully treated.

Methods: 82 year-old male patient with primary open-angle glaucoma with preoperative IOP of 28 mmHg with maximum medical therapy underwent phaco-trab surgery with Ologen uneventfully. On postoperative day 1, the bleb was formed, diffuse without Seidel sign and the anterior chamber was shallow (without iridocorneal touch), anterior chamber fibrin reaction and an IOP of 4 mmHg. The patient was started on topical moxifloxacin QID, topical dexamethasone 6 times/daily. On postoperative week 1, the anterior chamber was slightly shallow and there was improvement of the inflammatory reaction, with partial resolution of fibrin membrane in the anterior surface of the IOL and an IOP of 8 mmHg. On postoperative week 2, there was significant and global shallowing of the anterior chamber with an IOP of 22 mmHg. The bleb was well-formed, there was no Seidel sign and the iridectomy was patent. Furthermore, there was a significant myopic shift to -7.00D -0.25Dx90º in the autorefractor.

Results: AS-OCT imaging was taken from the patient, showing persistence of the fibrin membrane in the anterior surface of the IOL and significant anterior shift of the IOL-capsular bag complex with globally shallow anterior chamber. The patient was started on atropine 1% TID, in addition to the dexamethasone QID and reassessed 5 days later. There was deepening of the anterior chamber and a decrease in IOP to 10 mmHg, therefore postponing the need for Nd:YAG laser iridotomy with anterior hyaloidotomy and posterior capsulotomy.

Conclusion: Although aqueous misdirection most often presents with markedly elevated IOP, in rare instances the IOP may be in the normal range. Our patient had intense fibrin reaction with possible shutdown of the cilliary body with diminished production of aqueous humor, which might explain the near-normal range of IOP. AS-OCT can be a valuable imaging tool for assessing the IOL-capsular bag complex in pseudophakic patients. Early recognition of aqueous misdirection and appropriate treatment can prevent devastating visual consequences.

P2.14
Effects of erythropoietin on neuroprotection in an experimental glaucoma model

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Purpose: Glaucoma is a progressive, irreversible optic neuropathy that is the leading cause of blindness worldwide. In our study, we aimed to show the neuroprotective effect of erythropoietin on glaucoma.

Methods: Twelve male and twelve female Albino Wistar rats (6 weeks old; 220 ± 40 grams) from Adnan Menderes University Experimental Animal Center were used. All animals were housed in a fixed room on a 12/12 hour light/dark cycle per day, with food and water provided ad libitum. Rats were divided into 4 groups as control and glaucoma groups, subconjunctival erythropoietin and topical erythropoietin groups. At the end of the 6th week, right eyes were enucleated and total retinal thickness, ganglion cell complex, inner plexiform layer, ganglion cell layer thickness measurements were determined.

Results: Ganglion cell layer, inner plexiform layer, retinal thickness and ganglion cell complex thickness were observed the least in the glaucoma group and the most in the control group. There was no significant difference between erythropoietin administration routes ($p > 0.05$). Cell layer thicknesses in each group were confirmed by immunohistochemical staining, and apoptotic cells were not detected by bax or bcl-2 staining.

Conclusion: The neuroprotective effect of erythropoietin has been demonstrated and there is a need to repeat the study with larger series.

P2.15
unctional analysis of glia cells in RGC using coculture system

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Purpose: We have reported that mesencephalic astrocyte derived neutrotrophic factor (MANF) secreted from midbrain is involved in neuroprotection by co-culture system. We have now examined the effects of glia cells on neuroprotection using applied co-culture system.

Methods: Primary retinal ganglion cells from 4-5days rats after birth and glia cells from rats were cocultured using 3D-transwell or vitrigel culture system. Using RT-PCR and immunoblot analysis, multi array, the expression levels of the several survival markers of retinal ganglion cells were studied. Also, the extension of neurites of retinal ganglion cells after coculture was examined by immunoflurorescence analysis.

Results: Co-culture of glia cells and RGCs, no remarkable neuroprotective function by in normal conditioned RGCs (21% O_2). But, in additional oxidative stress (hypoxia, 1% O_2), we found increase in the expression of neural markers and extension of neurites after coculture with glia cells compared to without that in retinal ganglion cells. So, the coculture with glia cells was blocked the damage from oxidative stress in retinal ganglion cells.

Conclusion: Co-Culture with retinal glia cells suggested the possibility of various signaling pathways involved in in vivo neuroprotection. In the future, based on this signal pathway, we will clarify the factors that involved in the survival of RGCs

P2.16
Evaluation of neuroprotective and immunomodulatory properties of mesenchymal stem cells in an ex-vivo retinal explant model

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Purpose: Mesenchymal stem cells (MSCs) have raised hope for the treatment of glaucoma. Their neuroprotective and regenerative potentials are interesting for this degenerative neuropathy in which retinal ganglion cell (RGC) death leads to a progressive loss of vision. Yet, despite promising results in animal models, no definitive treatment has been developed, and safety concerns have been reported in human trials. Microglial immunomodulation represents a promising therapeutic approach in which MSCs might play a crucial role. In this study, we investigated the neuroprotective and immunomodulatory properties as well as the safety of MSCs in an ex vivo neuroretina explant model.

Methods: Labeled rat bone marrow MSCs were placed in co-culture with rat retinal explants after optic nerve axotomy. We analyzed the neuroprotective effect of MSCs on RGC survival by immunofluorescence using RBPMS, Brn3a and NeuN markers. Gliosis and retinal microglial activation were measured using GFAP, CD68 and ITGAM mRNA quantification and GFAP, CD68 and Iba1 immunofluorescence staining. We analyzed the mRNA expression of both 'M1' or classically activated state inflammatory cytokines (TNFÐ, IL1Ð and IL6), and 'M2' or alternatively activated state microglial markers (Arginase 1, IL10, CD163, and TNFAIP6).

Results: The number of RGCs was significantly higher in retinal explants cocultured with MSCs compared to the control group at Day 7 following optic nerve axotomy. Retinal explants co-cultured with MSCs showed decreased mRNA markers of gliosis and microglial activation, and immunostaining revealed that GFAP, Iba1 and CD68 were limited to the internal layers of the retina compared to controls showing expression of activated microglia throughout the retina. In addition, MSCs inhibited the M1 phenotype of the microglia. However, edema of the explants was observed in the MSC co-culture group, with an increase of fibronectin labelling at the surface of the explant corresponding to an epiretinal membrane-like phenotype.

Conclusion: Using an ex vivo model, we demonstrated a neuroprotective and immunomodulatory effect of MSCs on RGCs. Unfortunately, the presence of MSCs also led to explant edema and epiretinal membrane formation, as described in human trials. Using the MSC secretome might offer the beneficial effects of MSCs without their adverse effects, through paracrine signaling.

P2.18
In vitro evaluation of sodium hyaluronate protective effect against benzalkonium chloride

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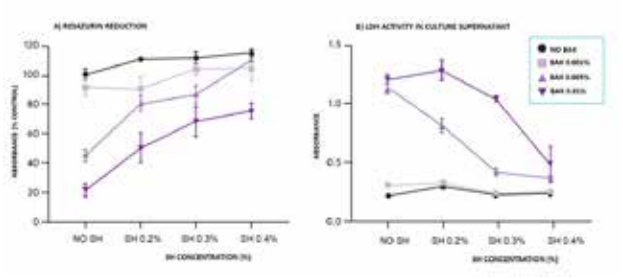
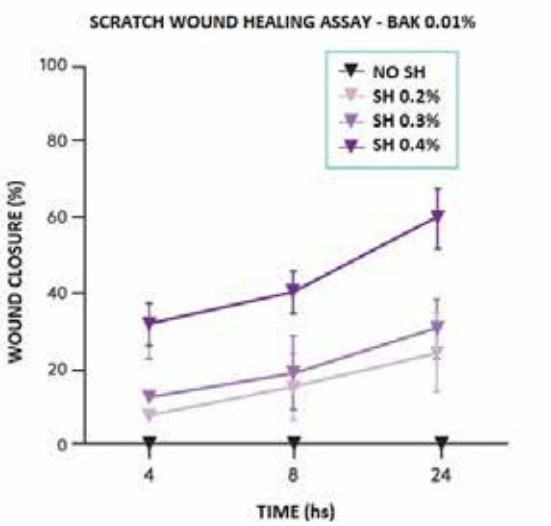
Purpose: Long-term exposure to benzalkonium chloride (BAK) causes toxicity reactions on the ocular surface. Sodium hyaluronate (SH) has been postulated as a potential neutralizing agent for BAK-induced toxicity. The goal of this work was to evaluate the protective effect of SH on BAK-induced toxicity.

Methods: The NAV14 cell line (SV40-immortalized murine conjunctival epithelium) was used. Cell monolayers were exposed to different concentrations of BAK (0.001%; 0.005%; 0.01%) and SH (0.2%; 0.3%; 0.4%) for 15 minutes; then, the cells were washed, and fresh culture media was added. Cell viability was evaluated after 2 h by resazurin reduction and lactate dehydrogenase (LDH) enzyme release. Also, cell migration and proliferation over 24 hours were determined by the scratch wound-healing assay. Data was analyzed by two-way ANOVA. Statistical significance was $p < 0.05$.

Results: BAK induced a concentration-dependent decrease on cell viability (BAK 0.001%: 91 ± 14%, BAK 0.005%: 45 ± 9% and BAK 0.01%: 22 ± 10% of control cells, $p < 0.001$) and an increase in LDH release (no BAK: 0.22 ± 0.02, BAK 0.001%: 0.31 ± 0.02, BAK 0.005%: 1.14 ± 0.05 and BAK 0.01%: 1.21 ± 0.05, $p < 0.001$). Conversely, SH neutralized these effects also in a concentration-dependent manner ($p < 0.001$). In the presence of SH 0.4% (highest effect), cell viability was BAK 0.001%: 104 ± 22%, BAK 0.005%: 109 ± 9% and BAK 0.01%: 75 ± 13% of control cells ($p < 0.001$ for BAK 0.005-0.01%) while LDH release was no BAK: 0.24 ± 0.03, BAK 0.001%: 0.26 ± 0.01, BAK 0.005%: 0.37 ± 0.02 and BAK 0.01%: 0.49 ± 0.22%, (vs no SH: $p < 0.001$ for BAK 0.005-0.01%). BAK also reduced wound closure (after 24 h, no BAK: 76 ± 14%, BAK 0.001%: 42 ± 12%, BAK 0.005%: 17 ± 16% and BAK 0.01%: 0.0% wound closure, $p < 0.001$ for all BAK). Conversely, SH neutralized this effect in a concentration-dependent fashion ($p < 0.001$). In the presence of SH 0.4% (highest effect), wound

closure at 24 h was: no BAK: 81 ± 15%, BAK 0.001%: 58 ± 6%, BAK 0.005%: 63 ± 10%, BAK 0.01%: 60 ± 8% (vs no SH: p < 0.001 for BAK 0.005-0.01%).





Conclusion: SH neutralized BAK toxicity on conjunctival epithelial cells in a concentration-dependent manner. SH 0.4% was even protective at the highest preservative concentration. These findings support the use of SH to mitigate BAK toxicity in patients, although more studies are needed.

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P2.19
Intraoperative OCT-assisted ophtalmic surgeries and it's novel use in open angle glaucoma surgery: cases report

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Purpose: The present work demonstrates the surgical utility of the Artevo 800, a microscope that incorporates the use of optical coherence tomography (OCT) imaging, allowing real time tomographic assessment and volumetric visualization. Although it is not the first time that it has been used in ophthalmic surgery, it is the first time that it has been used in Mexico as part of the surgical treatment of primary open-angle glaucoma.

Methods: Three cases of primary open-angle glaucoma are presented, approached in different ways and at different times, but in addition to the use of Artevo 800, the first microscope used in ophthalmic surgery. A first case treated with phacoemulsification with intraocular lens implantation, a patient treated with trabeculectomy and a third patient treated by transscleral cyclophotocoagulation with micro pulsed laser.

Results: The three procedures performed with the support of Artevo 800 demonstrated superior surgical precision than other similar ones performed without intraoperative oct. The surgeon's perspective showed greater precision and decreased surgical time, the follow-up was without complications or side effects.

Conclusion: Artevo 800 has been used in procedures such as keratoplasty, cataract surgery and other anterior and posterior segment surgical procedures, now it is presented as the first step in the next generation of surgical procedures in open angle glaucoma in Mexico.

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P2.20
Bimatoprost implant effects on 24-hour intraocular pressure

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Purpose: Intracameral, biodegradable, bimatoprost implant (Durysta) provides slow, continuous release of bimatoprost to lower intraocular pressure (IOP). 24h IOP control may play a role in preventing glaucoma progression. This study evaluated the effects of a single implant administration on 24h IOP lowering.

Methods: Multicenter, open-label, 12month phase-3b study (NCT04285580) in patients with open-angle glaucoma (OAG) or ocular hypertension (OHT). On Day1, the experimental group (n = 31) received a 10-µg bimatoprost implant in the study eye. IOP (supine and sitting) was evaluated by masked personnel with a Reichert Model 30 pneumatonometer every 2h at Baseline (BL) and Week (W) 8. Goldmann applanation tonometry (GAT) IOP measurements were taken at 8am at BL, W8, W16, and Months 6, 9, and 12. The primary endpoint was hour-matched change from BL (CFB) in habitual position IOP at W8 assessed with the pneumatonometer. The study is ongoing; analysis used data from the primary database lock, when the last enrolled patient completed the W8 visit.

Results: Mean IOP was 24.2 ± 2.70 and 25.3 ± 7.15 mmHg at BL Hour 0 (8am) with GAT and pneumatonometry, respectively. Pneumatonometer measurements of IOP taken over 24h at W8 with the participant in the habitual position (sitting 8am-10pm; supine 12am-6am) demonstrated consistent IOP lowering through the day and night. Fluctuation in IOP (defined as range in IOP over 24h, or standard deviation (SD) of all 12 IOP measurements over 24h) was reduced from BL at W8; mean (SD) CFB in range: -1.6 ± 2.98 mmHg; mean (SD) CFB in SD: -0.28 ± 0.85 mmHg. While IOP measurements differed with the

method of IOP assessment, both pneumatonometry and GAT demonstrated IOP lowering at 8am, W8.

Conclusion: The bimatoprost implant provided consistent IOP reduction in the habitual position at all timepoints over 24h, unlike beta-blockers, which are ineffective at night. The magnitude of IOP reduction measured with GAT was consistent with results of the phase-3 bimatoprost implant studies. Study limitations include the small sample size. One-year safety outcomes will be reported at study completion. The bimatoprost implant reduced IOP consistently through the day and night and also reduced IOP fluctuation over 24h in individuals with OAG and OHT.

P2.21
Efficacy and drug tolerability of preservative-free latanoprost-timolol fixed combination in glaucoma and ocular hypertension patients with existing ocular surface disease switched from the preserved prostaglandin analog-timolol fixed combinations

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Purpose: To evaluate the effect of switching the preserved prostaglandin analog-timolol fixed combinations (PG-timolol FCs) to preservative-free latanoprost-timolol FC [T2347 (Fixalpost®) Laboratories Théa, Clermont Ferrand, France] on intraocular pressure (IOP) lowering efficacy and the local drug tolerability in glaucoma and ocular hypertension (OH) patients, with concurrent ocular surface disease (OSD).

Methods: Longitudinal, prospective, interventional study of drug tolerability and efficacy – a real life study. The data from 36 patients, mean age 67.14 ± 7.78 years, were collected and analyzed between March 2021 and September 2021. Patients were switched from preserved latanoprost, travoprost, or bimatoprost with timolol FCs to preservative-free latanoprost-timolol FC (PF-LT) on the baseline visit. Patients were examined on days 1, 30, and 90. At each visit all the participants underwent Goldman applanation tonometry, assessment of the extent and severity of OSD symptoms by using Ocular Surface Disease Index (OSDI) Questionnaire, assessment of conjunctival hyperemia by using the McMonnies-Chapman-Davies scale, assessment of the blepharitis by using the Efron's scale, and the eyelids and periocular hyperemia assessment. Registers: Primary ClinicalTrials.gov Identifier: NCT04891588, Secondary DRKS - German Clinical Trials Register, DRKS-ID: DRKS00024581.

Results: Significant reduction in overall median IOP has been shown on the second visit (day 30), which remained stable to the third visit (day 90) (16 vs. 14 vs. 14 mmHg, $p < 0.001$). Also, significant improvements were demonstrated in OSD symptoms (median OSDI score 27.1 vs. 9.6 vs. 4.2, $p < 0.001$) and signs, conjunctival hyperemia (2 vs. 1 vs. 1, $p < 0.001$), blepharitis (2 vs.1 vs. 1, $p < 0.001$), and eyelid and periocular hyperemia (61.1 vs. 12.5 vs. 2.8 %, $p < 0.001$), form baseline to the second and the third visits.

Conclusion: Switching from preserved PG-timolol FCs to PF-LT (Fixalpost®) significantly reduced symptoms and signs of OSD, improved ocular drug tolerability, and consequently quality of life with effective reduction of intraocular pressure.

P2.22
The effect of antiglaucomatous drugs on central corneal thickness in patients with primary open-angle glaucoma: 5-year results of 1152 patients. Retroprospective study

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Purpose: We aimed to compare the long-term effects of all antiglaucomatous drugs and their combinations on central corneal thickness (CCT), such as 5 years.

Methods: Patients diagnosed with primary open-angle glaucoma in the ophthalmology department of our hospital between 2010-2021 were included in the study. CCT measurements were performed again in patients who had a previous diagnosis of glaucoma and had been using the same monotherapy drug regularly for at least 5 years. Patients who used the same and monotherapeutic antiglaucoma drugs regularly were divided into 7 groups; AA: brimonidine tartrate 0.2%, combined AA: brimonidine tartrate 0.2% timolol maleate 0.5% fixed combination, SAI: dorzolamide hydrochloride, Combined SAI: dorzolamide hydrochloride 0.2%/timolol maleate 0.5% fixed combination, PG: latanoprost, Combined PG: latanoprost % 0.005/timolol maleate 0.5% fixed combination BB: patients who used timolol maleate 0.5%. The data obtained in the research were analyzed with the SPSS 25.0 version package program.

Results: Of 1152 patients evaluated in the study; mean age was 61.9 ± 11.8 (33-78) and 256 (77.8%) of the cases were male and 896 (22.2%) were female. A statistically significant reduction in CCT was observed in patients using PG and combined PG (both $p < 0.001$). On the contrary, a statistically significant increase in CCT was observed in patients using CAI ($p < 0.001$). No statistically significant difference was observed in the other drug groups.

Conclusion: According to the results of our study, we suggest that PG and its derivatives should not be selected in patients with thin CCT, in the selection of PG and combined PG, in addition, caution should be exercised in the use of CAI in patients with low endothelial number, and that CCT measurement should be repeated at certain time intervals in long-term use of antiglaucoma.

P2.23
Extended duration of IOP lowering with bimatoprost implant in a phase 3 clinical trials study extension

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Purpose: Biodegradable, intracameral bimatoprost implant slowly releases bimatoprost to lower intraocular pressure (IOP). In clinical trials, the duration of IOP lowering with the implant has extended beyond the period of intraocular drug bioavailability. The duration of IOP control provided by bimatoprost implant was evaluated in a phase 3 clinical trials study extension.

Methods: A 24-month, open-label, ongoing study extension (NCT03891446) enrolled patients with open-angle glaucoma or ocular hypertension who had completed a bimatoprost implant phase 3 trial. Analysis using data available on 11 Feb 2021 evaluated IOP and use of added (rescue) IOP-lowering treatment in patients who received 10- or 15-µg bimatoprost implant (on Day 1, Weeks 16, 32) in one of the 2 lead-in 20-month phase 3 trials (ARTEMIS).

Results: Of 200 patients enrolled in the extension study after completing ARTEMIS, 69 were unrescued at screening, 54 remained unrescued for ≥ 2 years after their last bimatoprost implant treatment, and 18 remained unrescued for ≥ 3 years after their last bimatoprost implant treatment. Mean (± SD) IOP for the 54 patients was 23.5 ± 1.9 mmHg at the ARTEMIS baseline and 17.3 ± 3.6 mmHg at 2 years after the last bimatoprost implant treatment. For the 18 patients who were unrescued at 3 years, IOP was 23.0 ± 1.5 mmHg at the ARTEMIS baseline and 16.6 ± 3.2 mmHg at 3 years after the last bimatoprost implant treatment. The visual fields of these patients were unchanged from baseline.

Conclusion: Patients can have sustained IOP control without treatment and stable visual fields for ≥ 2 years after their last bimatoprost implant administration in a phase 3 trial. As drug release from the implant is complete within 3 – 4 months, the mechanism of the long duration of IOP reduction is under investigation.

P2.24
Wound healing response after minimally invasive glaucoma surgery in the rabbit

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Purpose: Glaucoma is the leading cause of irreversible blindness worldwide. The primary risk factor for glaucoma is increased intraocular pressure (IOP). Current treatments focus on reducing IOP via drugs or surgical interventions. Although surgical intervention is highly effective, clinicians tend to withhold from surgery and possible vision threatening complications. Approximately 10% of surgeries that depend on a filtering bleb fail due to postoperative formation of fibrosis. During this study, we aimed to identify potential cellular targets for the development of anti-fibrotic therapies.

Methods: Fifteen rabbits were implanted with a SIBS microshunt. In vivo IOP was measured, and bleb survival was assessed. Optical coherence tomography (OCT) and slit-lamp (SL) examinations were used to assess ocular health throughout the experiment. Animals were euthanized at post-operative day (POD) 1, 5 and 40 for histological evaluation.

Results: Blebs failed around POD 15, IOP measurements revealed a lower IOP at POD 1 compared to baseline ($p = 0.007$), indicating a successful implantation. No severe complications related to the surgery were seen. Histological analysis showed a wide variety of cells present throughout different postoperative days, including granulocytes (POD 1 and 5), leucocytes (POD 5 and 40), fibroblasts (POD 1, 5 and 40), myofibroblasts (POD 40), and foreign body giant cells (POD 5 and 40). Additionally, the conjunctiva was thicker at POD 1 and 5.

Conclusion: A high diversity of cells was involved during the wound healing response after implantation with a SIBS microshunt, including granulocytes, leucocytes, foreign body giant cells, and epithelial cells. These cells could offer potential targets for the development of novel anti-fibrotic therapies.

P2.25
The influence of anti-hypertensive eye drops and preservatives in the ocular surface of primary open-angle glaucoma patients

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Purpose: To evaluate the influence of long-term use of topical anti-hypertensive drops (TAHD) and preservatives in the ocular surface of primary open-angle glaucoma (POAG) patients.

Methods: Cross-sectional study assessing the tear film of POAG patients with basal tear flow measured with basic secretion test, osmolarity measured by TearLab® and the non-invasive break-up-time (NIBUT), blink rate (BR), lipid layer thickness (LLT), tear meniscus height (TMH), and loss area of the meibomian glands measured by IDRA® Ocular Surface Analyser. Patients' symptoms were assessed using the Ocular Surface Disease Index (OSDI). A linear mixed-effects model was designed to assess the effect of TAHD and preservatives in the ocular surface parameters, adjusted for age, sex and the use of artificial tears.

Results: Two-hundred and nineteen eyes of 111 patients were enrolled with a mean ± SD age of 69.92 ± 14.07, of which 37.8% were male. Almost half of the patients (45.0%%) were under only one class of TAH drops. Beta-blockers (BB; 65.3%) and prostaglandins (PG; 58.3%) were the most used TAHD. Eighty (37%) eyes were using an artificial tear and 99 (45.2%) eyes used eyedrops with preservatives. PG presented a reduction of TMH (ß = -0.069, p = 0.049) whereas carbonic anhydrase inhibitors displayed an increase (ß = 0.019, p = 0.004) of the same parameter and of BR (ß = 9.248, P = 0.034); beta-blockers (BB) users presented lower values in BST (ß = -5.538, $p < 0.001$) and an increase of tear osmolarity; the use of alpha-agonist (AA) displayed a trend for lower tear osmolarity (ß = -9.984, $p < 0.001$); and the presence of preservatives in the eyedrops for a higher LLT (ß = 10.456, p = 0.059).

Conclusion: The use of BB, AA and PG was associated with changes in ocular surface parameters predisposing to dry eye disease, in agreement with the current evidence. CAI presented a higher TMH which can be explained by the increased BR. The presence of preservatives was associated with trend for an increased LLT which might be explained by reverse causality as patients with less stable tear film might have developed symptoms, being weaned out of preservatives previously.

P2.26
Magnesium supplementation does not influence circumpapillary vessel density in normal-tension glaucoma

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Purpose: Magnesium contributes to vascular dilation by acting as a calcium antagonist and increasing the production of vasodilators like nitric oxide. For this reason, magnesium supplementation has been suggested for patients with normal-tension glaucoma (NTG) to improve ocular blood flow. Still, there is a lack of evidence for this clinical practice. The aim of this study was to evaluate the effect of magnesium supplementation on retinal vessel density in patients with NTG.

Methods: In this intervention study 19 patients with NTG were recruited at the Medical University of Graz. Patients received a soluble granulate containing 670 mg magnesium carbonate and 432 mg magnesium oxide 2 times daily for 1 week. OCT angiography cube scans of the optic disc were acquired with a scan size of 4.5× 4.5 mm. Vessel density of the whole image and in the circumpapillary superior, nasal, inferior and temporal area were acquired at the baseline visit and after one week of magnesium supplementation.

Results: Out of 19 patients 17 were female (89.5%) and the mean age was 66.74 (10.6) years. After one week of supplementation, serum magnesium increased significantly from baseline (0.85 vs. 0.91 mmol/L ($p = 0.003$)). Vessel density did not change after supplementation with magnesium neither on the whole image, in the circumpapillary area, nor in single quadrants of the circumpapillary area ($p > 0.05$).

Conclusion: Although a significant rise of blood serum magnesium after one week was observed, no significant difference in vessel density could be demonstrated.

P2.27
The effect of metformin on glaucoma lamina cribrosa cells

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Purpose: The Lamina Cribrosa (LC) is a key site of retinal ganglion cell axonal injury in Primary Open Angle Glaucoma (POAG). Our lab has previously shown human glaucoma LC cells have pro-fibrotic altered gene expression and mitochondrial dysfunction. Metformin has been shown to have anti-fibrotic effects in numerous organ systems. In this study, we aim to assess Metformin's effect on glaucomatous LC cells by carrying out a systematic mitochondrial bioenergetic assessment and measuring markers of fibrotic activity.

Methods: Human LC cells from age matched normal and confirmed glaucoma donors were assessed using a Seahorse XFe96 Analyzer. Glaucoma LC cells were treated with Metformin at different doses (10 mM, 5 mM, 2 mM, 1 mM, 0.5 mM, 0.1 mM and 0.05 mM) and a dose response curve was assessed. The optimal dose of metformin was then utilised to examine extracellular matrix (ECM) gene expression (Col1A1, a-SMA, and fibronectin) with real time RT-PCR.

Results: Glaucoma LC cells have lower basal and maximal oxygen consumption rate (OCR), lower spare respiratory capacity and lower ATP production than the normal cells. Treatment with Metformin, however, significantly improves maximal OCR (0.473 ± 0.026 pmol/min vs 0.398 ± 0.083 pmol/min) ($p < 0.05$) and spare respiratory capacity (0.193 ± 0.035 pmol/min vs 0.168 ± 0.046 pmol/min) ($p < 0.05$) in glaucoma cells. The most effective Metformin dose was 0.1 mM. Metformin treatment with this dose (0.1 mM) resulted in a significant reduction of the ECM gene expression seen in glaucoma LC cells ($p < 0.05$).

Conclusion: We demonstrate evidence of mitochondrial dysfunction and enhanced ECM gene expression in glaucoma LC cells and subsequent improvement with Metformin treatment. These results may provide some explanation as to the reduced POAG incidence in those taking Metformin. A better understanding of Metformin's effect on mitochondrial dysfunction and fibrosis may aid the development of a disease modifying agent in POAG.

P2.28
Two-year results from a European Study of a supraciliary glaucoma drainage device in patients with open angle glaucoma

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Purpose: To describe the safety and efficacy of a novel, supraciliary, minimally invasive glaucoma surgery (MIGS) drainage system, MINIject® (iSTAR Medical), in open-angle glaucoma patients.

Methods: In the prospective STAR-II study, 29 patients from 8 European sites successfully received the MINIject implant during a stand-alone, ab-interno procedure. The primary endpoint is the success rate > 60%, 6 months post-operatively. Success is defined as diurnal intraocular pressure (IOP) ≤21 mmHg and >5 mmHg with a minimum 20% reduction from baseline, with/without glaucoma medication. Results up to 24 months are reported.

Results: Mean diurnal IOP was reduced by 9.2 mmHg (36%) from 24.6 ± 3.8 mmHg at baseline to 15.5 ± 5.7 mmHg in 27 patients reaching 24 months. Mean medication use was reduced by 52% from 2.9 ± 1.2 at baseline to 1.4 ± 1.5. At 24 months, 78% of patients reached success. The most common adverse events were IOP increase and visual acuity reduction. Mean endothelial cell loss at 24 months was 7% with no patient exceeding 30% loss from preoperative baseline.

Conclusion: MIGS represent a safety advantage compared to other (ab-externo) surgical treatments. This study confirms the efficacy of a supraciliary MIGS implant, reducing IOP and glaucoma medication use.

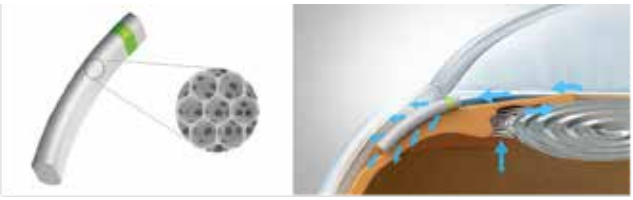

Figure 1. MINIject implant© iSTAR Medical, Wavre, belgium. The device is 5 mm long and made of biocompatible STAR© material which is made of soft and flexible silicone in micro-pouros network design. The device is placed in the supraciliary space during a stand-alone, ab-interno procedure.

P2.29
Eye surface status after therapeutic switch from bimatoprost 0.1 mg/ml with benzalkonium chloride or bimatoprost 0.3 mg/ml preservative-free to a new bimatoprost 0.1 mg/ml preservative-free: an observational study

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Purpose: Prostaglandin analogs are the most effective medication in primary open-angle glaucoma (POAG) and they are usually recommended as first choice treatment but are often associated with eye surface disorders. The aim of this study was to evaluate whether, in patients with POAG, the therapeutic switch from a formulation of Bimatoprost 0.1 mg/ml with benzalkonium chloride (BAK) or Bimatoprost 0.3 mg/ml preservative-free to a formulation of Bimatoprost 0.1 mg/ml preservative-free could improve eye surface status; intra-ocular pressure (IOP) was also evaluated as the secondary endpoint.

Methods: This open observational study was subdivided into two sub-studies. In the first (Study A) were enlisted patients in monotherapy with Bimatoprost 0.1 mg/ml with BAK. In the second (Study B) patients in monotherapy with Bimatoprost 0.3 mg/ml preservative-free. Then, these patients who met the inclusion criteria were eligible for the therapeutic switch to Bimatoprost 0.1 mg/ml preservative-free once a day. To evaluate the ocular surface status break-up time (BUT) test and ocular surface disease index (OSDI) test were used. The clinical evaluations were performed at T0 (basal visit); T1 (beginning treatment after 7 days of washout); T2 (after 14 days from T1); T3 (28 days from T1). At each check visit, enrolled patients underwent BUT test, OSDI test, and 3-point tonometric curve (8.00-13.00-18.00).

Results: A total of 40 patients were enrolled (23 in study A and 17 in study B). In study A, a significative difference of BUT and OSDI was recorded. At baseline BUT was 6.87 ± 2.16 sec while at T3 8.17 ± 2.29sec ($p = 0.0006$); at baseline, OSDI score was 33.74 ± 12.02 while at T3 it was 23.00 ± 10.70 ($p < 0.0001$). Similarly, significative differences were found in study B. At baseline BUT was 5.71 ± 1.16sec while at T3 6.59 ± 1.12sec ($p < 0.0001$); at baseline OSDI score was 38.88 ± 4.95 while at T3 it was 33.06 ± 4.63 ($p < 0.0001$). IOP was equally distributed among treatments (Study A $p = 0.92$; Study B $p = 0.97$).

Conclusion: Bimatoprost 0.1mg/ml preservative-free has a better tolerability profile associated with non-therapeutical inferiority in the control of IOP compared to the other Bimatoprost formulations. BUT and OSDI improvement, corresponding to an improvement in the comfort of the patient, also leads to a greater and better therapeutic compliance.

P2.31
Efficacy and tolerability of netarsudil 0.02%/latanoprost 0.005% compared with bimatoprost 0.03%/timolol 0.5% in patients with open-angle glaucoma or ocular hypertension: findings from the MERCURY 3 study

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Purpose: This study assessed the efficacy, safety and tolerability of a novel Rho kinase inhibitor netarsudil 0.02% in fixed-dose combination (FDC) with the prostaglandin analogue latanoprost 0.005% (NET/LAT), compared with a bimatoprost 0.03%/timolol 0.5% (BIM/TIM) FDC in patients with primary open-angle glaucoma(POAG) or ocular hypertension (OHT).

Methods: This was a prospective, randomized, double-masked, active-controlled study across 11 European countries. Adults with POAG or OHT, with a medicated IOP of ≥ 17 ≤ 28 mmHg were included. The primary efficacy outcome was non-inferiority in mean IOP reduction between treatments (95% CI ≤ 1.5 mmHg at all time points and ≤ 1.0 mmHg at ≥ 5 of 9 time points) through Month 3. IOP and tolerability were assessed over 6 months.

Results: Overall, 430 patients were randomized 1:1 to treatment with NET/LAT or BIM/TIM, 95.3% were Caucasian and the mean age was 67.2 (22-91) years. Clinical non-inferiority of NET/LAT to BIM/TIM was demonstrated in the intent-to-treat population, with the upper limit of the 95% CIs around the difference (NET/LAT–BIM/TIM ≤ 1.5 mmHg at all 9 time points and ≤ 1.0 mmHg at 6 of 9 time points at Week 2, Week 6, and Month 3). Mean IOP reduction throughout the day (diurnally adjusted from baseline) ranged from -9.94 to -9.03 mmHg for NET/TIM and -10.41 to -8.45 mmHg for BIM/TIM. Ocular-related treatment-emergent adverse events (TEAEs) were more frequent with NET/LAT than with BIM/TIM: conjunctival hyperemia (30.7% vs 9.0%, respectively), cornea verticillata (11.0% vs 0.0%), eye pruritus (7.8% vs 0.9%) and punctate keratitis (5.5% vs 1.9%). Most TEAEs were mild or moderate. No treatment-related serious TEAEs were reported in either arm. No new TEAEs that have not been previously observed in studies investigating the individual components were reported. Systemic TEAEs were approximately 1% in each group.

Conclusions: NET/LAT was non-inferior to BIM/TIM in patients with POAG and OHT and provided efficacious reduction of IOP over 6 months. NET/LAT was associated with more TEAEs than BIM/TIM but generally well tolerated, with no new safety signals compared to previous studies of the individual agents. This investigation builds on evidence from the US-based MERCURY 1 and 2 studies.730

P2.32
Preliminary results of a new long-tube glaucoma drainage device made from innovative materials: a short-term rabbit study

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Purpose: The main treatment for refractory glaucoma is placement of a long-tube glaucoma drainage device (GDD), or cyclodestructive procedures as a last resort. Unfortunately, GDDs often fail, mainly due to high IOP as a result of fibrosis/scarring and inflammation. After 5 years, studies (e.g., AVB and ABC studies) have shown a cumulative failure rate above 40% among different GDDs. Therefore, the aim of our study is to develop, and test a novel GDD, made from a superior polymer, in a cohort of rabbits, and compare it to the Ahmed Glaucoma Valve (AGV).

Methods: Twenty-one New-Zealand White rabbits (10 males, 7 animals per group) received either an AGV- (FP8), a smooth-surface GDD (ssGDD), or a GDD with tissue-enhancing-surface topographies (teGDD) in their right eye. IOP was recorded at baseline (day before surgery) and at postoperative days (POD) 1, 5, 7, 14, 21, 27 and 28, and ocular photos and scans were made. At POD 28, animals were euthanized and eyes were enucleated for histological evaluation.

Results: At POD 14, all wounds were healed with vascularization returning to baseline levels. However, one AGV eroded through the conjunctival tissue. In all groups, IOP decreased postoperatively in the operated eye. IOP decreased from 11.7 ± 0.7 mmHg to 9.0 ± 0.5 mmHg after placement of a ssGDD, from 12.0 ± 0.7 mmHg to 9.2 ± 1.0 mmHg after teGDD, and from 12.4 ± 1.1 mmHg to 8.8 ± 0.5 mmHg after AGV implantation.

Conclusion: All implants effectively lowered IOP; histological data analysis will further elucidate the most optimal wound healing response.

P2.33
Management of uveitic glaucoma in South East of Serbia

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Purpose: To investigate the characteristics of uveitic glaucoma (UG) in south-eastern Serbia

Methods: This study included 144 patients who has visited the glaucoma department Ophthalmology Clinic, Clinical Center Nis, Serbia, between January 2017 and May 2021, diagnosed with secondary open-angle glaucoma or closed-angle glaucoma in at least one eye due to uveitis. Patients were inspected for age, sex, medical history, any ophthalmological surgical procedures, biomicroscopical findings, intraocular pressure (IOP) values and type of ocular treatment.

Results: A total of 144 consecutive patients (185eyes) were included in this study. 145 eyes (81.4%) had open-angle glaucoma and 40 eyes (18.6%) had closed-angle glaucoma. The mean patient age was 46.76 ± 15.6 years. Sixty patients (57.8%)

were male and 44 patients (42.2%) were female. The causes of uveitis included, Fuchs heterochromic iridocyclitis (FHI) (n = 32), ankylosing spondylitis (n = 19), herpes simplex virus uveitis (n = 16), Posner-Schlossman syndrome (n = 8), Behçet's disease (n = 10), Vogt-Koyanagi-Harada disease (n = 2). A further 58 patients were diagnosed with idiopathic uveitis. Acute anterior uveitis was the most common type of presentation, diagnosed in 66 patients (88 eyes). The mean pre-treatment IOP was 35.6 ± 9.4 mmHg. The median IOP in the last follow up was 16 (7-38) mmHg. Patients were using 2 (0-5) ant glaucomatous drops in the last visit. Mean number of glaucoma surgical procedures was 41. Most common surgery was trabeculectomy in 55 eyes (37.5%),3 eyes (5.3%) had undergone set on implantation.

Conclusion: Glaucoma is one of the most serious complications of intraocular inflammation. In our study, the most common causes of UG were FHI and Behçet's disease, respectively.

P2.35
Multiple surgical approach to ICE syndrome: report of an unexpected event

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Purpose: To determine, through the experience gathered in this case, if it's possible to apply multiple procedures in complex cases such as essential iris atrophy, a variety of iridocorneal endothelial syndrome where the coexistence of uncontrollable OHT with severe iridian alterations is frequent. In addition, to report on the persistent adherence of blood clot to iris prosthesis surface as a specific hazard of this combination of techniques

Methods: Clinical follow-up over 4 years of a patient affected by essential iris atrophy, with systematic data collection in different forms such as clinical history, slit-lamp photographs and video recording through surgical microscope

Results: We present the case of a 47-year-old woman, who showed unilaterally (OS): Medically controlled ocular hypertension, polycoria, corectopia and slightly low endothelial cell count. These clinical features were consistent with essential iris atrophy. Throughout the follow-up, her IOP became uncontrollable despite maximal medical therapy, and the pupillary abnormalities worsened. A filtering surgery was mandatory but pupillary distortion also required a surgical approach, so we decided to go for an ExPress implant with two additional maneuvers: Lensectomy (with IOL implant) and complete iridectomy (with iris prosthesis implant in bag). With this multiple procedure, we expected to avoid sequential surgeries that could risk the filtering bleb. Postsurgical assessment (bleb development, IOP, anterior chamber inflammation and depth) was always within a satisfactory range. The most prominent and unexpected finding was a blood clot, strongly attached to the iris prosthesis and interfering with the visual axis. In the third week, a particle migrated from this clot obstructed the shunt, requiring YAG lysis. The following day, an intracameral injection of tPA definitely removed the clot. One year later, IOP remains in a 8 - 12 mmHg range, and BCVA is 20/40

Conclusion: Attending to the reported post-surgical evolution, we think that multiple procedures are feasible and can be an advantage in complex settings as ICE syndromes. However, the blood attributable to the iridectomy and the high adherence between it and the iris prosthesis can cause incidents that threaten filtration. Special surveillance of these problems is mandatory to ensure the success of the intervention.

P2.36
Traumatic hyphema and angle recession without glaucomatous optic neuropathy: a case report

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Purpose: We present an unusual case of an angle recession after traumatic hyphema that was solved with medical treatment.

Methods: A 52-year-old male presented complaining of blurred vision in the right eye (RE) after a traumatism. On examination, he presented unreactive right pupil and right visual acuity (VA) was light perception and left VA was 1.0. The anterior chamber had +4 red blood cells with a 4 mm formed hyphema. He presented microcystic corneal edema and intraocular pressure (IOP) of 45 mmHg RE and 15 mmHg in the left eye. Examination of the right fundus was not possible, but B-scan showed an applied retina. He was treated with atropine, dexamethasone, beta blockers, brimonidine and prostaglandin-analogues and oral acetazolamide. At 24 hours, he presented a VA of 0.2 and IOP of 24 mmHg in RE, with persistence of the level of hyphema in the anterior chamber. A few days later he returned complaining of severe eye pain. He presented an IOP of 64 mmHg for which an evacuating paracentesis was performed, reaching a post-procedure IOP of 22 mmHg. Surgical removal of hyphema was proposed, but it was solved with medical treatment and absolute rest. He was discharged with dexamethasone every 3 hours, beta blockers and brimonidine every 12 hours, cyclopentolate 1% every 8 hours and oral acetazolamide every 8 hours. One month later he was reevaluated: the VA was 0.5 in RE, with some hematic cells in the anterior chamber, no hyphema, and the IOP was 22 mmHg.

Results: At 6 months, he presents a VA of 1.0 in both eyes. On examination he presents unreactive and irregular mydriasis with transillumination defects. Gonioscopy revealed angle recession 270º in RE, but IOP remains at 16 mmHg without treatment and he has a cup-disc ratio of 0.3 in both eyes.

Conclusion: Sometimes hyphema must be resolved by surgical intervention. In this case, it was resolved with medical treatment and repose, without severe sequels. Angle recession increases the risk of developing secondary glaucoma. It is a common slit lamp and gonioscopic finding following ocular trauma and often requires long term monitoring to prevent irreversible optic nerve damage.

P2.37
Peculiarity of the glaucoma care in Ukraine

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Purpose: To study the dynamic of objective data of Glaucoma care in Ukraine.

Methods: Analyses of the statistical data of Ministry of Health of Ukraine (morbidity, clinical report)

Results: It was revealed the increase of number of glaucoma cases on 10-12 % during last 3 years, the increase of the number of medical therapy with PGAs prescribing with the stable number of surgery (STE and NPDS).

Conclusion: During last 3 years we noted positive changes in diagnostic and treatment of glaucoma patient as a result of the implementation of the 4th and 5th editions of «Terminology and Guidelines for Glaucoma» in clinical work.

P2.38
Psychological aspects related to glaucoma in a developing country

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Purpose: Though it has been suggested that glaucoma is associated with circadian misalignment, sleep disorder, anxiety, and depression, these comorbid conditions have not received much attention. This study investigates the relationship of various psychological conditions like depression, anxiety, and stress with glaucoma in a developing country.

Methods: A sample of 200 glaucoma patients (100 males, 100 females) was collected from different eye clinics and hospitals in Islamabad between July and December 2020. Only those patients who gave verbal consent to participate in the research and were diagnosed as suffering from uncomplicated open angle glaucoma by the specialist ophthalmologists were included. The main questionnaires used for this study for grading general stress, anxiety and depression was DAS. Simple descriptive statistics were adopted for data analysis using the Student's t-test, correlation and regression. Significant probability level was set at $p < 0.05$.

Results: Twenty-two per cent of the study population was tested positive for psychiatric disorders i.e. depression and anxiety and stress. Analysis of gender differences showed that females were high on depression ($p = 0.049$), anxiety ($p = 0.038$) and stress ($p = 0.046$) as compared to males.

Conclusion: Results of this study indicate that a high percentage of glaucoma patients presenting in eye clinics of Pakistan were also affected by various psychological disorders. These mental issues may lead to further decrease in quality of life scores in these patients. Hence there is a need to address these psychological aspects in addition to providing routine clinical management of glaucoma patients.

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P2.39
Prescription burden of antiglaucoma drugs in a developing country

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Purpose: Glaucoma management has a very strong impact on society, especially in terms of morbidity, consultations and medical costs because glaucoma patients need to continue using medication throughout their lives. The study aimed to estimate the pattern of socioeconomic status and prescription burden of antiglaucoma drugs in glaucoma patients with comorbidities like hypertension and diabetes mellitus.

Methods: This cross-sectional study was conducted in a tertiary care eye hospital, Rawalpindi, Pakistan. Glaucoma patients were interviewed for 6 months and variables like demographics, education level, monthly income, disease distribution, medication history, prescription pattern were noted and monthly cost of all drugs, socioeconomic status and prescription burden were assessed from the data.

Results: Out of 876 patients, 511 were males and 38.4% were from the 40-60 year's age group. The majority were jobless, dependent upon others with no formal education and 89.1% belonged to lower socioeconomic status. Comorbidities include Hypertension (27%) and Diabetes mellitus (18.8%). The mean monthly cost of ocular drugs was 599.73 ± 491 PKR (Approximately 3.5 ± 2.5 USD) per patient.

Conclusion: Our findings describe that majority of our patients were non affording, elderly, dependent, multimorbid and belonged to lower socioeconomic levels with a high prescription burden of antiglaucoma drugs.

P2.40
Under-registration of visual impairment in glaucoma patients: why aren't we doing enough?

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Purpose: The Royal National Institute for the Blind (RNIB) recently estimated 1.9 million people have sight loss or blindness and glaucoma is one of the commonest causes. The aim of this study is to determine the extent of registration of sight-impaired glaucoma patients at a local level and ascertain factors influencing registration.

Methods: Records of patients risk stratified in glaucoma clinics as red-risk in October 2021 were retrospectively analysed. 125 out of 2163 records perused met the national criteria for certification of visual impairment. Of interest were parameters such as: proportion of patients recognised as eligible and registered; lag time between eligibility and registration; factors affecting registration including age, gender, ethnicity, visual acuity and diagnosis; and grade of doctor initiating the registration process. Analysis was performed in Excel and a chi-square test of independence was carried out with a significance level of $p \leq 0.05$.

Results: 41% (n = 51) were registered as either sight impaired or severely sight impaired. The average waiting time to be recognised as eligible was 6 months and 59% of these registrations were initiated by consultants. Although more men (43%) were registered than women (37%), this was not statistically significant. A significant association was found between race and likelihood of registration; patients of Afro-Caribbean origin were least likely to be registered (8%). Patients were least likely to be registered if: they had no decrease in central visual acuity despite having extensive field loss meeting the eligibility criteria; or if they only met the criteria for partial sightedness.

Conclusion: Sight loss has detrimental impacts through: the healthcare expenditure, indirect costs such as productive losses and burden of disease decreasing quality of life. This becomes more pertinent in the current pandemic with visually

impaired person reporting challenges being compounded by lockdown. Previous studies have shown little improvement in registration rates and this remains the case locally. As with our study, registration rates have been found to be proportional to the experience of the examining doctor. The Black and Ethnic Minorities (BAME) community remains significantly under-registered and measures for improving uptake need to be implemented at the local and national levels.

P2.41
Influence of pharmacological group in adherence to glaucoma medications in a wide population

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Purpose: To analyze the influence of main pharmacological group in adherence to glaucoma medications.

Methods: Observational retrospective study of patients (N 1602) perceiving glaucoma medications (minimum treatment time of six months). Medication possession ratio (MPR), extracted from claims data and defined as the number of months which complete prescription supply is collected from the pharmacy divided by the number of months between the first prescription and the last study visit. Is related in a univariate model with the pharmacological group using the Kruskal-Wallis test. $p < 0.05$ is considered statistically significant.

Results: In decreasing order, we have observed that the Prostaglandines have the highest MPR rate (83.34), followed by Beta blockers (68.76), Carbonic anhydrase inhibitors (44.75) and Alpha agonist (30.27). All this with a statistical significance of P less than 0.05.

Conclusion: Therefore, with an error of 0% ($p = 0$), the MPR differs according to the prescribed pharmacological group, observing a higher rate of persistence in Prostaglandines and Betablockers and a lower persistence in Carbonic anhydrase inhibitors and Alpha agonist.

P2.42
Influence of preservatives and dose-format in adherence to glaucoma medications in a wide population

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Purpose: To analyze the influence of preservatives and dose-format in adherence to glaucoma medications.

Methods: Observational retrospective study of patients (N 1602) perceiving glaucoma medications (minimum treatment time of six months). Medication possession ratio (MPR), extracted from claims data and defined as the number of months which complete prescription supply is collected from the pharmacy divided by the number of months between the first prescription and the last study visit. Is related in a univariate model with the presence of preservatives (U Mann Whitney) and the uni or multi-dose format (U Mann Whitney). $p < 0.05$ is considered statistically significant.

Results: Patients with prescriptions without preservatives have obtained a mean MPR of 72.38 while patients with prescriptions with preservatives have obtained a mean MPR of 66.16. All this with a statistical significance of P less than 0.05 (0.034). Patients with uni-dose eyedrops have obtained a mean MPR of 71.32 while patients with multi-dose eyedrops have obtained a mean MPR of 67.17. All this with a statistical significance of P greater than 0.05 (0.14)

Conclusion: Patients whit prescriptions without preservatives have shown to have more adherence to topical antiglaucoma medication. No difference was found according to dose format.

P2.43
Prevalence of ocular hypertension/secondary glaucoma in uveitis

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Purpose: To calculate the prevalence of ocular hypertension (OHT) or secondary glaucoma (SG) in uveitis referral patients.

Methods: An observational retrospective study of patients with uveitis seen between 2017 and 2021 in the Uveitis Department from Hospital Universitario de Jerez (Cádiz, SPAIN). OHT/SG patients are identified as those who required ocular hypotensive treatment. Prevalence of OHT/SG is related in a univariate model with different types of uveitis: anterior, posterior, panuveitis and intermediate. (Chi-squared test, $p < 0.05$ is considered statistically significant).

Results: A cohort of 434 patients with uveitis have been studied and 105 patients requiring ocular hypotensive treatment have been found: global OHT/SG prevalence is 24.2% in our population. OHT/SG prevalence is significantly associated with the type of uveitis ($p < 0.0001$) in the following order: anterior uveitis (30.4%), panuveitis (21.6%), intermediate uveitis (11.1%) and posterior uveitis (1.7%).

Conclusion: Our research found the prevalence standards of OHT/SG associated with uveitis (24.2%) observed in the scientific literature. Anterior uveitis is the most frequent type of uveitis associated with OHT/SG (30.4%).

P2.44
The recruitment process of an epidemiology study amidst the COVID19 pandemic: experience, challenges, learning points and preliminary data on glaucoma epidemiology

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Purpose: The Malta Eye Study is a cross-sectional ophthalmic epidemiology study on the Maltese population aged between 50-80 years. The purpose of this presentation is to share the recruitment challenges and strategies to collect data during the

COVID-19 pandemic.

Methods: Data is being collated over two years from a randomised sample of 2000 subjects from the Maltese Electoral Register, using postal invitations for assessments. The assessments include a questionnaire, anthropometric and ophtahlmological examinations, OCT scanning and saliva collection for DNA analysis. These are performed by the lead researcher and trained assistants. A pilot study was held in early 2020. Improvements in recruitment were suggested; eg: calling the invitees from 1 week before, increasing the number of invitees per session and using SMS as a reminder for invitees to attend. An attempt at re-recruitment in early March 2020 was abandoned due to the emergence of the COVID-19 pandemic and lockdown.The study started recruiting post vaccination rollout in September 2021.

Results: Up until the date of submission of this abstract, 294 people participated in the study, with an overall turnout of 40%. This is significantly lower than known local survey attendance rates of 60% (p = 0.000) (Calleja and Garthwaite, 2016). The negative impact of COVID-19 has been seen in terms of poorer turnout rates (36% in December 2021), when local figures spiked, and staff shortage problems. Low attendances can be explained by people's fear of contracting COVID-19 from a study within a hospital setting, the people's decreased interest and motivation to attend surveys, the large number of vulnerable, infected or quarantined invitees and the holiday season. Inviting more people, using media platforms to advertise the study, calling people at different times of the day as well as using SMS are useful but costly strategies to help improve attendances. Out of 294 participants, 2.4% (1.0 - 4.8% 95% CI) had IOPs > 21 mmHg and 2.7% (1.2 - 5.3% 95% CI) had glaucoma (1:1 ratio of new to known cases). 2.4% (1.0 - 4.8% 95% CI) had pseudoexfoliation.

Conclusion: The pandemic resulted in poorer attendances and the strategies used to maintain the survey's momentum are costly but hopefully rewarding.

P2.45
Publication and outcome reporting bias based on the registration status in glaucoma surgical trials: a systematic review

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Purpose: Despite the optimum of quality evidence randomized controlled trials (RCTs) provide, biases may be introduced and hinder their application. The primary objective of this study is to investigate outcome reporting bias and publication bias in RCTs investigating the surgical treatment of glaucoma.

Methods: A literature review was conducted in MEDLINE, EMBASE and CENTRAL databases. Inclusion criteria included RCTs published in English between 2007 and 2021 that focused on the surgical treatment of patients of all ages with glaucoma or elevated intraocular pressure. Exclusion criteria included cadaveric and animal studies. Studies quality was assessed based on the Jadad score.

Results: 7,561 citations were screened after deleting duplicates. 161 RCTs were eligible and included between 13 and 556 participants. 91% of them studied an adult population suffering predominantly from primary open-angle glaucoma (71%). Among included studies, 63% were not registered and 47% had statistically significant results. An upward correlation in registration was observed with time. However, 37% of the studies showed discrepancies between objectives in clinical trial registries and the published results. Risk factors for studies at higher risk of bias will be identified in further statistical analyses.

Conclusion: Recording of RCTs is essential to ensure greater transparency and appropriate interpretation in the surgical management of patients with glaucoma. It would allow assessment of the quality, internal validity and external validity of the studies and help guide clinical decisions for a better care.

P2.46
Eliciting preferences in glaucoma management - a systematic review of stated-preference studies

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Purpose: Glaucoma represents a group of chronic, progressive neuropathies, characterized by structural damage to the optic nerve and visual field loss. In most cases, glaucoma requires long-term medical and/or surgical treatment. Preference studies investigate how different aspects of glaucoma management like health or process outcomes are valued, and herewith help stakeholders make care more responsive to the patient's needs. This systematic review provides an overview of these studies.

Methods: A systematic literature review was conducted by two independent reviewers searching PubMed and EMBASE databases using keywords for preferences and glaucoma up to October 2021. Studies were included if they were published in a peer-reviewed journal, were on the topic of glaucoma, and used a stated-preference methodology that elicited preferences in patients and/or health care professionals. Data were extracted, summarized, and a quality appraisal of the included studies was performed using two validated checklists (PREFS and ISPOR conjoint analysis checklist).

Results: The search yielded 1,214 articles after removal of duplicates. Of those, 11 studies (published between 2005 and 2021) fulfilled the inclusion criteria. Studies aimed to elicit preferences for glaucoma treatment (27%), glaucoma related outcomes (36%), and care (36%) from a patient (91%) or ophthalmologists (9%) perspective. All studies were undertaken in high income countries. The attributes and levels used were identified by literature research, expert consultation, or qualitative research. Altogether studies included 69 attributes. Most attributes were outcome related (62%), followed by process (32%) and cost attributes (6%). Outcome attributes were most often of highest importance for the population. Most publications received four out of five when evaluated according to the PREFS (Purpose, Respondents, Explanation, Findings and Significance) checklists.

Conclusion: This systematic review provides an up-to-date and critical review of stated-preference studies in the field of glaucoma, suggesting that patients have preferences and are willing to trade-offs between treatment characteristics.

P2.47
Impact of minimally invasive glaucoma surgery on the ocular surface and quality of life in patients with glaucoma

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Purpose: The purpose of this study was to explore the impact of minimally invasive glaucoma surgery (MIGS) on patient-reported outcomes and clinical parameters related to ocular surface disease in people with glaucoma.
Methods: Fifty-seven patients were examined prior to undergoing iStent combined with phacoemulsification with or without adjunctive endocyclophotocoagulation and at 4-month follow-up.

Results: At follow-up, on average patients returned statistically significantly improved scores on glaucoma-specific (GQL-15, p = <0.001; GSS, p = < 0.001), general health (EQ5D, p = 0.02) and ocular surface PROMs (OSDI, p = 0.001). Patients were using fewer eye drops on average after MIGS compared to before surgery (1.1 ± 0.9 versus 1.8 ± 0.8; p = < 0.001). Undergoing MIGS was associated with improved tear film break-up time (p = < 0.001) and reduced corneal fluorescein staining (p = < 0.001).

Conclusion: Quality of life and clinical parameters related to the ocular surface are improved following MIGS combined with phacoemulsification in patients previously treated with anti-glaucoma therapy.

P2.48
Glaucoma clinical research: trends in treatment strategies and drug development

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Purpose: To investigate the trends and progresses in glaucoma research by searching two major clinical trial registries; clinicaltrials.gov, and Australianclinicaltrials.gov.au.

Methods: All clinical trials with glaucoma covered by Clinicaltrials.gov, and Australianclinicaltrials.gov.au starting the study before 1 January 2021 were included. Trials evaluating glaucoma treatment were separated from non-treatment trials and divided into three major categories: "laser treatment," "surgical treatment," and "medical treatment." In the category of "medical treatment," new compounds and their individual targets were identified and subcategorized according to treatment strategy; intraocular pressure (IOP) -lowering, neuroprotective or vascular. The phase transition success rates were calculated.

Results: One-thousand five hundred and thirty-seven trials were identified. Sixty-three percent (n = 971) evaluated glaucoma treatment, of which medical treatment accounted for the largest proportion (53%). The majority of medical trials evaluated IOP-lowering compounds, while trials with neuroprotective or vascular compounds accounted for only 5 and 3%, respectively. Eighty-eight new compounds were identified. Phase I, II, and III transition success rates were 63, 26, and 47%, respectively.

Conclusion: The number of clinical trials in glaucoma research has increased significantly over the last 30 years. Among the most recently evaluated compounds, all three main treatment strategies were represented, but clinical trials in neuroprotection and vascular modalities are still sparse. In addition to traditional medicines, dietary supplements and growth factors are assessed for a potential anti-glaucomatous effect. Phase II and III success rates were below previously reported success rates for all diseases and ophthalmology in general. A stricter phenotyping of patients can improve the success rates in glaucoma and ophthalmological research and gain a better understanding of responders and non-responders.

P2.49
Correlation between iris color and glaucoma type

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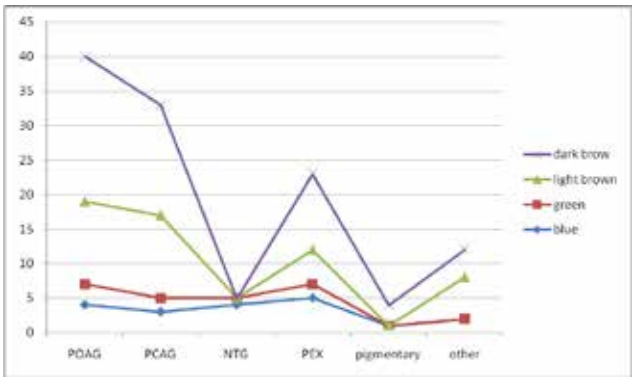
Purpose: To examine the correlation between iris color and glaucoma type through a cross-sectional study.

Methods: In 117 glaucoma patients relevant data was recorded, including iris color and the type of glaucoma. The correlation between iris color and sex of patients, age, type of glaucoma, intraocular pressure and central corneal thickness of both eyes was tested.

Results: Our study population consisted of 38.5% men and 61.5% women. Primary open-angle glaucoma was present in 34.2% and primary closed-angle glaucoma in 28.2% of patients. Blue iris was found in 16.2%, green in 6.8%, light brown in 29.9% and dark brown in 47% patients. Statistically significant correlations were found between glaucoma type and sex (p = 0.001), glaucoma type and iris color (p = 0.031) and central corneal thickness and iris color (p = 0.027).

Conclusion: A statistically significant correlation of iris color and glaucoma type was confirmed, indicating that people with darker irises develop glaucoma more often than people with lighter irises. Although we haven't been able to determine the relationship between sex and intraocular pressure with iris color, our results show a higher incidence of glaucoma in females, as well as higher values of central corneal thickness in people with darker irises.



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P2.50
An audit to assess if our patients with glaucoma have informed the driving and vehicle licensing agency

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Purpose: In the UK, all patients who have glaucoma in both eyes, or glaucoma in on eye and another ocular problem in the other eye, should inform the driving and vehicle licensing agency (DVLA). All patients who have glaucoma in one eye, regardless of the state of the other eye, should inform the DVLA if they drive commercial vehicles. The DVLA are the governing body who assess these patients to ensure they meet the minimum driving standards. An audit was used to assess if patients have informed the DVLA as per the guidelines and whether they had been advised to do so.

Methods: A prospective audit was performed and all patients who met the above inclusion criteria were asked if they hold a driving licence and if they had informed the DLVA of their diagnosis. We then asked them if they had been advised to inform the DVLA or not. These patients were asked during clinics and all patients who satisfied the inclusion criteria were included.

Results: No patients drove commercial vehicles. Out of 40 patients, 24 (60%) patients had informed the DVLA, and 16 (40%) patients had not informed the DVLA. Of the 24 patients who had informed the DLVA, 23 patients said they had previously been advised to do so and 1 was unsure. Of those 16 patients who had not informed the DVLA, 2 said they had been previously advised to do so, 12 said they had not been previously advised to do so, 1 could not remember and 1 was not asked.

Conclusion: Following the results of this audit, the department plans to add the DVLA guidelines and contact details to our glaucoma patient information leaflets. Furthermore, we plan to add this information to all clinic letters which get sent out to patients. The department uses the IT software Medisight, and it has been planned to add in a compulsory question to ask this information from our patients on each consultation, thus maximising the opportunities available to us to educate our patients. We hope to then re-audit this and ensure these figures improve.

P2.51
Factors associated with corneal hysteresis in an elderly population: the Thessaloniki Eye Study

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Purpose: To provide values of corneal hysteresis (CH) in an elderly, Greek healthy population and to investigate its association with demographic, ocular, and systemic factors.

Methods: Out of 1092 subjects from the incidence cohort of the Thessaloniki Eye Study (TES) that were invited to be re-evaluated between 2013 and 2015, there were 801 eligible participants according to pre-specified criteria. All subjects underwent an interview and a comprehensive clinical examination. Demographic data, medical and ophthalmic history, family history and smoking were recorded in a standardized questionnaire. The ophthalmologic examination included the assessment of best-corrected visual acuity (BCVA), visual field examination, autorefraction and measurement of average corneal radius of curvature, Goldmann applanation tonometry (GAT), gonioscopy, slit-lamp anterior segment examination before and after pupil dilation and dilated fundus slit-lamp biomicroscopy, axial length (AL) and central corneal thickness (CCT). CH was evaluated with Ocular Response Analyzer (ORA). Glycosylated hemoglobin (HbA1c) was estimated in all participants.

Results: The mean age of study subjects was 79.7 ± 3.9 years and 43.1% were females. The mean CH was 10.1 ± 1.5 mmHg. After adjusting for age, gender, CCT, AL, and diabetes, CH was positively associated with female gender ($\beta = 0.446$; $p < 0.0001$) and CCT ($\beta = 0.017$; $p < 0.0001$), and negatively associated with age ($\beta = -0.024$; $p = 0.038$) and AL ($\beta = -0.181$; $p < 0.0001$). There was no association between CH and diabetes ($\beta = 0.186$; $p = 0.10$). In a multivariate analysis of a smaller sample size, with corneal curvature (CC) as an additional covariate, no association was found between CH and CC ($\beta = -0.235$; $p = 0.26$).

Conclusion: The study outlined population-based variations in CH. With advancing age, the CH decreased. Women had greater CH compared to men. Eyes with thinner corneas and longer AL had lower values. No significant association was found between CH and CC, and the presence of diabetes.

P2.52
Remote decision-making: the outcomes of a shifting paradigm

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Purpose: Virtual ophthalmology clinics have been spreading worldwide to deal with the heavy burden of patient referral and follow-up appointment overload, particularly in glaucoma and retina departments. This paper describes the virtual clinic implementation process at Hospital Santa Maria - Centro Hospitalar Universitário Lisboa Norte (HSM-CHULN) and analyses its outcomes for the system, as well as for the quality of care provided to the patients.

Methods: A case-control retrospective analysis between similar cohorts before and after implementation was performed. Outcomes related to waiting time, number of hospital visits, decisions at first contact and quality of decision (defined as updated ancillary exams at time of treatment decision).

Results: 292 charts were reviewed (pre-virtual cohort: 132; virtual cohort: 160). Waiting time between referral and the first glaucoma contact decreased on average 71.3 days, while the waiting time between referral and the first informed glaucoma decision decreased on average 326.8 days. 12 (9.1%) patients had exams <3 months old before first contact in the prior system, when compared to 149 (93.1%) in the virtual setting. Screening at first contact allowed to label 107 (66.9%) as non-urgent; 30 (18.8%) as urgent, and 23 (14.3%) as immediate contact, with the scheduling of future consults reflecting NICE guidelines in 100% of these cases. The number of patient visits to perform the same exams and obtain the same clinical decisions was reduced by 63.6%.

Conclusion: Remote decision-making, even without allocation of extra resources can be a valuable tool in optimizing glaucoma care. Our strategy significantly decreased waiting time and hospital visits while increasing the rate of data-assisted clinical decision and allowed an effective screening tool. While results can be further improved, this system can be invaluable in an overburdened healthcare system.

P2.53
The performance of vertical cup-disc ratio on glaucoma diagnosis in a prevalence survey

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Purpose: To present the distribution of values for vertical cup-disc ratio (VCDR) as measured with the Heidelberg Retina Tomograph (HRT). Also, to assess the performance of VCDR in glaucoma diagnosis in a prevalence survey.

Methods: Data from the Thessaloniki Eye Study (TES), a population-based study on glaucoma in a Caucasian population, were used for this analysis. The population underwent a standardized, thorough clinical examination including visual field examination, optic disc photos and optic disc imaging with the Heidelberg Retina Tomograph (HRT). Glaucoma was defined on the basis of both visual field and optic disc damage. HRT findings were not part of glaucoma definition. In the present analysis, only images with Topography Standard Deviation (TSD) < 40 μm were included. Only one eye of each subject was included, according to an algorithm based on glaucoma diagnosis and TSD for each one of subject's eyes. HRT VCDR was used for this analysis.

Results: Among the 2261 clinic visit participants, 1620 consecutive subjects had an HRT examination. After applying inclusion criteria, data for 1337 subjects were available for the present analyses (69 glaucoma and 1268 controls).
The 97.5% percentile for vertical cup-to-disc ratio (VCDR) in the normal population was 0.74 (95% CIs: -0.16, 0.82). Among glaucoma patients, 40 had VCDR < 0.74. Among non-glaucoma subjects, 37 had VCDR ≥ 0.74.

Conclusion: Our results showed a value for the 97.5% percentile for VCDR slightly higher than other population surveys which reported it at 0.7. Previously published International Society for Geographical and Epidemiological Ophthalmology (ISGEO) criteria have proposed the classification of glaucoma based on optic disc criteria. The optic disc abnormality in this classification system is described as VCDR ≥ 97.5th percentile of that in the normal population. In our analysis, only 29 of the 69 glaucomatous patients had VCD R ≥ 0.74 and consecutively 40 glaucoma subjects had VCDR < 0.74. Therefore, 58% of glaucomatous patients would remain undiagnosed since they do not fulfill the criterion for VCDR. According to our findings, a significant number of glaucoma cases could be misdiagnosed if diagnosis was based on strict cutoffs for VCDR as measured with the HRT.

P2.54
Sociodemographic characteristics of glaucoma patients and quality of life in glaucoma

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Purpose: This study aims to evaluate the sociodemographic characteristics of the patients followed in the Glaucoma Unit of Istanbul University Istanbul Faculty of Medicine, Department of Ophthalmology, their quality of life with the modified Glau-QOL-17 Quality of Life questionnaire, the clinical data of the patients, and their relationship.

Methods: One hundred twenty-six patients aged 18 years and older, non-secondary glaucoma, diagnosed with glaucoma for at least 1 year, who came to the control examination between March and December 2020, participated in our study. The clinical and sociodemographic data of the patients at the last examination were obtained. The Modified Glau-QOL-17 Quality of Life questionnaire was applied to the patients, adding a few questions about the difficulties they may experience with

glaucoma. The patients were divided into 6 groups according to the visual field Mean Deviation (MD) value. According to the MD value of the patients, the eyes were defined as good eyes with good MD values and bad eyes with worse MD values. The effects of sociodemographic and clinical features on the quality of life were evaluated.

Results: While the "Daily Life" sub-dimension score (87.17 ± 18.68) was the highest in the scale, it was the lowest in the "Anxiety" sub-dimension (74.21 ± 23.25). Advanced age ($p < 0.01$), being married ($p < 0.05$), being retired ($p < 0.05$), having high best-corrected visual acuity for the bad eye ($p = 0.001$), bad eye's good MD value, being in the first group ($p = 0.001$) was associated with high scores, while being female ($p = 0.010$) have a high bad eye c/d ratio ($p = 0.020$), a diagnosis of primary angle-closure glaucoma (PACG) ($p = 0.011$), insomnia or migraine ($p = 0.013$, $p = 0.032$), and using 3 bottles of medication daily ($p = 0.029$) were found to be associated with low quality of life scores.

Conclusion: Glaucoma can affect the quality of life in different ways according to the sociodemographic characteristics of the patients. We believe that a holistic approach to glaucoma patients, as in every field of medicine, and personalized treatment planning will be beneficial in the success of the treatment and the compliance of the patients with the treatment.

P2.55
Quality of life in patients requiring treatment for glaucoma and ocular hypertension: a time trade-off study

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Purpose: The goal of glaucoma management is to maintain patients' visual function and quality of life. In this study, we assess quality of life in patients with ocular hypertension and glaucoma at all stages of severity by using the time trade-off method to calculate utility values (UVs).

Methods: Patients (n = 341) requiring treatment for open-angle glaucoma (primary open-angle glaucoma, pseudo exfoliative, and normotension glaucoma) or ocular hypertension from two clinical sites in London, United Kingdom were evaluated in a cross-sectional study. UVs were evaluated for the patients' health states using the time trade-off method. The Mean Deviation from Humphrey visual field analysis of each patient's worse eye was used to classify participants into mild, moderate, and severe visual field loss groups according to Hodapp-Parrish-Anderson Criteria.

Results: Mean UV for the whole patient cohort was 0.78 (standard deviation (SD) 0.26; 95% confidence interval (CI) 0.76 to 0.81). Of patients surveyed, 65% would rather trade some of their remaining years of life than experience the loss of quality of life resulting from their disease. Mean UV in patients with severe visual field loss [0.74 (SD 0.28)] was lower than for patients with mild visual field loss [0.82 (SD 0.24)]. The mean difference in UV between patients with mild and severe field loss was 0.089 (95% CI 0.010 to 0.142; $p = 0.007$).

Conclusion: Patients requiring treatment for glaucoma or ocular hypertension exhibit a substantial decrease in utility values, measured by time trade-off. Severity of visual field loss is inversely associated with quality of life.

P2.56
Dietary nitrate intake is associated with decreased incidence of open-angle glaucoma

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Purpose: Previous studies suggest that nitric oxide is involved in the regulation of the intraocular pressure (IOP) and in the pathophysiology of open-angle glaucoma (OAG). However, prospective studies investigating the effect of dietary nitrate intake, a source of nitric oxide, on incident (i) OAG risk are limited. Therefore it is of interest to determine the association between dietary nitrate intake and iOAG, and to evaluate the association between dietary nitrate intake and IOP.

Methods: Participants of the Rotterdam Study, a longitudinal population-based cohort study, were regularly monitored for iOAG. Dietary data were collected at baseline using validated food frequency questionnaires. Of 8679 participants, 7008 had baseline measurements of dietary nitrate intake and data on ophthalmologic examinations. Of these, 173 participants developed iOAG during follow-up. Participants with iOAG were matched with healthy controls on age and gender in a case:control ratio of 1:5. The association between dietary nitrate intake and iOAG was analyzed using multivariate conditional logistic regression analyses, adjusted for body mass index, total energy intake, diet quality, physical activity and follow-up time. Additional adjustment for IOP, smoking and education level was also performed. Furthermore, the association between dietary nitrate intake and IOP was assessed using multivariate linear regression analyses.

Results: iOAG was significantly less frequent in the higher total nitrate quintiles (p-trend = 0.05, Cochran-Armitage test for trend) and higher vegetable nitrate quintiles (p-trend = 0.03). Non-vegetable nitrate intake did not show a similar trend (p-trend = 0.18). Total nitrate was associated with a lower iOAG risk (OR [95% CI]: 0.75 [0.63-0.91], p-trend = 0.002). Both vegetable nitrate (OR [95% CI]: 0.77 [0.64-0.92], p-trend = 0.003) and non-vegetable nitrate (OR [95% CI]: 0.63 [0.41-0.96], p-trend = 0.08) showed a protective effect. Additional adjustment for IOP, education level and smoking status did not change the results. Dietary nitrate was not associated with IOP.

Conclusion: Dietary nitrate intake reduced the risk of iOAG significantly. There was a trend with lower risk of iOAG with increased dietary nitrate intake. We did not observe significant associations between dietary nitrate intake and IOP, suggesting that IOP-independent mechanisms may underlie the association with OAG.

P2.57
Assessment of the impact of an add-on and its smartphone application on the daily management of glaucoma: a pilot study

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Purpose: Glaucoma is the leading cause of blindness worldwide and adherence to glaucoma therapy is typically poor. One reason for poor glaucoma medication adherence is forgetfulness. To improve this issue, the add-on CONNECTDROP® and its application may benefit both ophthalmologists and patients by monitoring eye drop administration [1]. This study aimed to evaluate after 9 weeks of use the patient satisfaction about how CONNECTDROP® (connected add-on + smartphone application) helps to improve glaucoma patient compliance.

Methods: This single-center, single-arm, prospective pilot study included 31 patients, having glaucoma, already treated with preservative-free dorzolamide-timolol fixed combination (Duokopt®, Laboratoires Théa) and with a controlled Intraocular pressure (IOP) (< 18 mmHg). Patients received the study material at the inclusion visit and the daily instillations were recorded by the add-on for 9 weeks.

Results: The mean age of patients was 70.7 ± 8.0 years. Twenty-one patients (67.7%) had a glaucoma duration reported for more than 10 years. After 9 weeks, 74% of patients were satisfied or very satisfied with CONNECTDROP® and its application, 88.8% found the app easy to use or very easy to use and 70.3% consulted the app on a daily basis. The number of drops instilled per day was between 4.4 and 5.8 drops in average. The daily percentage of respected time interval between morning/evening drops was between 88.9% and 97.9 %. The weekly proportion of drops instilled with a proper inclination was between 69.4% and 71.0%. Most of the patients had a compliance score (considering number of drops, respect of time interval, inclination of the bottle) superior to 8/10. 52% found CONNECTDROP® better or much better than their previous treatment. For 64.5% of patients, the investigators agreed or totally agreed that CONNECTDROP® makes it easier to talk to patients about evaluating the follow-up of their treatment.

Conclusion: CONNECTDROP® allowed to monitor compliance with glaucoma therapy over 9 weeks with a very high patient satisfaction. Complementary studies are needed to confirm the improvement of adherence in real-life settings.

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P2.58
Cost-utility of trabecular bypass at the time of cataract surgery in a universal, single-payer health care system

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Purpose: To assess the cost-utility of trabecular bypass with cataract surgery versus cataract surgery alone in patients with mild-to-moderate open angle glaucoma (OAG) in a universal, single-payer health care system

Methods: Patients received trabecular bypass (iStent inject or Hydrus microstent) during cataract surgery versus cataract surgery alone, in a Markov model set in the Australian health care system over a 10-year horizon using TreeAge software. Both arms received additional ocular hypotensive agents to control intraocular pressure (IOP). Treatment effect was measured as percentage of medication-free patients, mean number of ocular hypotensive medications and IOP, which directly impacted transition probabilities. Health states included the Hodapp-Parrish-Anderson glaucoma stages (mild, moderate, advanced, blind) and death. One-way sensitivity and probabilistic sensitivity analyses were conducted on device efficacy and different time horizons.

Results: At 10 years, iStent inject with cataract surgery had an incremental cost-utility ratio (ICUR) of AUD 24125 per QALY, compared with cataract surgery alone. The ICUR of Hydrus microstent was AUD 4479 per QALY. Probabilistic sensitivity analysis was cost-effective in 67.6% of iterations for iStent inject (Figure 1) and 83.80% for Hydrus (Figure 2) at a willingness-to-pay threshold of AUD 50000 per QALY. The probability of side-effects with eye drops, utility decrement with side-effects, cost of the devices and real-world efficacy rate had the greatest impact on model outcomes. iStent inject must have a real-world efficacy rate of at least 88% of the published data to be cost-effective at 10 years, while Hydrus must be 79% as effective as published data.

Conclusion: Trabecular bypass during cataract surgery seems to be cost-effective for patients with mild-to-moderate glaucoma in a universal, single-payer health care system. However, real-world efficacy must closely match published trial data and be maintained to obtain cost-effectiveness. More long-term, high-quality, independent data is required on both safety and efficacy outcomes with both devices.

Figure 1. Incremental cost-effectiveness ratio acceptability curve for iStent inject (circles) compared with cataract surgery alone (squares).

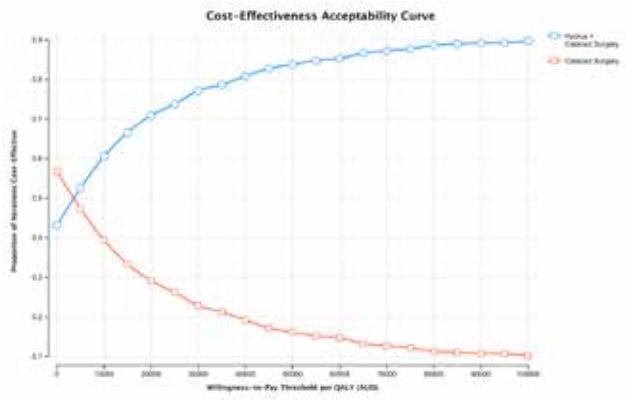

Figure 2. Incremental cost-effectiveness ratio acceptability curve for Hydrus microstent (circles) compared with cataract surgery alone (squares).

P2.60
IOP elevation after intravitreal injections with Ozurdex

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Purpose: To determine the frequency of intraocular pressure (IOP) elevation after intravitreal dexamethasone implant (Ozurdex).

Methods: We conducted a retrospective study of 500 patients who received intravitreal Ozurdex for a wide range of macular diseases from September 2011 to September 2021 identified using electronic medical records. The IOP was measured by Goldman applanation tonometry before the treatment and 1, 3 and 6 months post-operatively. We defined IOP elevation as a IOP > 21 mmHg or an increase in the number of IOP-lowering drugs at any follow-up visit. We performed logistic regression analysis to test possible predictors of IOP elevation.

Results: 500 eyes were identified. The mean patient's age was 70.11 years (range 30-90). 200 were female (40%) and 300 were male (60%). The most frequent diagnoses were diabetic retinopathy (279 patients, 55.8%) and retinal vein occlusion (203 patients, 40.6%). Of all 500 patients, 187 (37.40%) had an IOP elevation in at least one visit. We did not observe any correlation between IOP elevation and diagnosis or spherical equivalent refraction. However, we did find a positive association with male gender (odds ratio 1.78, p = 0.003) and a negative association with older age (odds ratio 0.98, p = 0.016).

Conclusion: IOP elevations are a common complication of intravitreal injection with Ozurdex. In our population, this event does not seem to be more likely in patients with refractive errors or macular oedema caused by diabetes mellitus or retinal vein occlusion. Moreover, our results suggest a higher risk of this complication in male patients, while older patients seem to be slightly protected compared to their younger counterparts.

P2.61
Secondary glaucoma in patients with familial amyloid polyneuropathy in Cyprus

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Purpose: This study investigates the frequency, severity and factors influencing the incidence of secondary glaucoma associated with familial amyloid polyneuropathy (FAP) from the Cyprus cohort.

Methods: This is a retrospective non interventional study on patients with genetically confirmed ATTRV30M neuropathy diagnosed at the Cyprus Institute of Neurology and Genetics that were referred to our department between 2008 and 2021. Sixty six patients were reviewed. Patients having glaucoma or ocular hypertension were defined as patients with IOp > 21 mmHg and/or glaucomatous optic neuropathy and/or visual field loss. Possible associations such as the presence of fringed or scalloped pupil and previous liver transplantation were made, as well as the need for surgical intervention and severe visual impairment due to glaucoma.

Results: Out of the 66 screened patients, twenty four had glaucoma or ocular hypertension (36%). From those patients, eight suffered severe visual impairment due to glaucomatous damage (33.3%) and thirteen (54%) needed surgical intervention. Twenty out of the twenty four glaucoma patients (83%) had undergone liver transplant as part of their FAP treatment, and eleven out of the thirteen patients needing surgery (84.6%), whereas six out of eight severely impaired patients (75%) had undergone liver transplant. All of the glaucoma and ocular hypertension patients had amyloid deposits in the anterior segment and the so called fringed or scalloped pupil.

Conclusion: There are only a few studies in current literature that address secondary glaucoma due to FAP, possibly due to the worldwide rarity. The disease is considered endemic in Cyprus with the Val30Met the sole mutation. Our results show that secondary glaucoma in FAP is common and can lead to severe visual impairment. The deposition of ocular amyloid is almost always present in patients with glaucoma, with the so called fringed or scalloped pupil to be a strong sign of identifying patients at risk. Patients previously undergone liver transplant as treatment for FAP also seem to be at greater risk.

P2.62
Teaching home tonometry using a remote video link

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Purpose: Intraocular pressure (IOP) is the primary modifiable risk factor in the progression of glaucoma. The ICare HOME is a self-tonometer which empowers patients to measure their own IOP and allows a more complete picture of diurnal IOP. In previous studies self-tonometry has been taught in the glaucoma clinic. This project aims to determine the feasibility of teaching patients to perform self-tonometry remotely using a remote video link.

Methods: This prospective study involved 12 patients with

glaucoma attending an outpatient ophthalmology clinic. Participants were provided with a rebound tonometer (Icare HOME) and instructions to attend remote teaching from home. An optometrist conducted a 30-minute live video training session via NearMe with each patient. Following training, participants were asked to measure their own IOP, observed remotely by the optometrist. Successful participants were asked to take a series of home IOP measurements over 48 hours. Questionnaires were used to evaluate perceptions on home tonometry and remote training.

Results: Participants had an average age of 60.1 ± 15.5 years. 58% (7 of 12) were female. 83% (10 of 12) obtained successful diurnal measurements at home. All participants were happy with remote teaching, and none would have preferred training to be conducted face-to-face. All participants were interested in continuing home IOP monitoring. Some patients reported the pandemic increased their willingness to use video calling.

Conclusion: Most patients were able to perform home tonometry successfully when taught remotely, with a success rate similar to previously reported rates for face-to-face teaching using the same device. Most participants were receptive to using video calling as a platform for teaching home tonometry. Teaching home tonometry remotely can further negate the need for patients to attend outpatient clinics to monitor IOP.

P2.63
A retrospective study to assess visual field improvement following augmented trabeculectomy

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Purpose: To explore the visual field (VF) changes 2 years following augmented trabeculectomy.

Methods: A retrospective study of patients who underwent augmented trabeculectomy surgery with Mitomycin C by a single surgeon at East Lancashire Teaching Hospitals NHS Trust over 3 years. Patients with a minimum of two years post operative follow-up were included. Baseline characteristics, IOP, VF, number of glaucoma medications and complications were recorded.

Results: 206 eyes were included, 97 (47%) patients were female and the mean age was 73.8 ± 10.3 (range 43 to 93) years. 131 (63.6%) eyes were pseudophakic before trabeculectomy. The patients were divided into three outcome groups according VF outcome. 77 (37.4%) patients had stable VF, 35 (17.0%) patients showed VF improvement and 94 (45.6%) had VF deterioration. The overall mean pre operative IOP was 22.7 ± 8.0 mmHg and post operative IOP 10.4 ± 4.2 mmHg, with a reduction of 50.2% ($p < 0.001$). 84.5% of post operative patients did not require glaucoma medications. A higher number of patients with post operative IOP≥15 mmHg had deteriorating VF ($p < 0.001$). Based on pre operative MD distribution, VF improvement or stability was more achievable with patients with a pre operative VF defect up to -12 dB (n = 41, 59.4%) and in those with greater than -24dB (n = 25, 64.1%).

Conclusion: Trabeculectomy continues to be an effective means of lowering IOP in patients with uncontrolled glaucoma and is important in stabilising or improving visual fields. We recommend early trabeculectomy to prevent further VF deterioration. This may help in maintaining VF for driving status and thus quality of life.

P2.64
Glaucoma app as a tool for improvement of patients compliance

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Purpose: Glaucoma is one of the leading causes of irreversible blindness worldwide. Its prevalence among the population over the age of 40 years is more than 2% and increases significantly with age. The global prevalence of glaucoma patients is expected to be about 112 million people by the year 2040. The registered number of glaucoma patients in Kazakhstan was 133.4 per 100 000 population in 2018. The treatment of glaucoma requires daily use of medication and regular physician visits. Otherwise, poor adherence to medications leads to fast glaucoma progression and vision loss. Kazakh Scientific Research Institute of Eye Diseases developed a mobile glaucoma app for education and enhancement of glaucoma patients' compliance.

Methods: 194 glaucoma patients from several ophthalmological centers of Kazakhstan were invited to participate in the study for evaluation of the interest in application use. The mobile application is available in Russian, Kazakh version is being developed. The mobile app includes four main sections: All about Glaucoma (informational videos), My data (diagnostic results storage), My regimen (alarm for medicine administration) and Contact My Ophthalmologist.

Results: The mean age of participants was 58.5 (± 17.3) years. There were 65,5% of women and 34,5% of men. 62% indicated that they were very interested in using the app. The design was liked by 77% and functionality in 76% of the participants. Navigation was positively evaluated by 78% of participants and 22% of users noted that not all the necessary information is available in the app; 55% indicated they would recommend the app to their friends and relatives and 34% of participants said they would use the app even if it was not free.

Conclusion: The glaucoma smartphone app can be used as a tool to facilitate patient involvement and responsibility for their own health status and disease self-management. This study demonstrates significant interest of potential users in the glaucoma app as a tool with which to support their disease self-management goals. The various features of the app were evaluated positively and most participants agreed that the features were essential and useful.

P2.65
Early detection of rapid glaucoma progression in elderly patients: a retrospective clinical study on 474 patients

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Purpose: The aim of this study is to point out the importance of comprehensive clinical screening in the earlier detection of the likelihood of rapid progression towards advanced stages of glaucomatous optic neuropathy in glaucoma patients. we focused on three specific clinical conditions commonly involved in severe glaucoma progression in our region; namely, exfoliation, thin cornea and angle closure.

Methods: We included 474 consecutive glaucoma patients, according to our predefined inclusion and exclusion criteria. All patients older than 40 years old, with a mean deviation of

visual field worse than -15 decibels in at least one eye of the same patient were included. All patients presenting secondary glaucoma except exfoliation as well as acute angle closure glaucoma, cornea edema, dystrophic cornea and concomitant neurologic or other ocular diseases were excluded. Diagnosis was based on a detailed eye examination, visual fields analysis, and measurement of central corneal thickness.

Results: The mean age was 69.25 ± 10.73 years old with a male gender predominance (59.3% vs 40.7%). Mean intra-ocular pressure was 26 ± 14.85 mmHg with a mean number of anti-glaucoma treatments of 2,80 ± 1,19. The average central corneal thickness for all patients was 507.4 ± 36.7 microns, whereas 38,2 % of the patients had a CCT less than 500 microns. Angle closure and exfoliation syndrome have been found respectively in 38.8% of patients and in 44.3% of patients. 92.1% of eyes presented at least one of the 3 factors: very thin cornea, exfoliation syndrome or angle closure.

Conclusion: A comprehensive screening for three signs: exfoliation syndrome, thin cornea and angle closure, during initial examination and follow-up of glaucoma patients, would be helpful to detect and better manage fast progression at earlier stages.

P2.66
Use of a novel diagnostics sign-posting tool to streamline glaucoma virtual reviews

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Purpose: As the burden upon ophthalmic services increases, the risk of significant harm occurring to those with chronic conditions such as glaucoma becomes more prominent. Strategies to support patients are assessed by the right clinicians in the right clinical setting must be developed in order to reduce the risk of avoidable permanent sight loss due to delays in assessments. Whilst virtual review pathways have been discussed in the literature, simple methods of directing this activity have scarcely been explored. We review the impact that a simple sign-posting tool could have on the running of glaucoma diagnostics asynchronous virtual review services.

Methods: Retrospective review of virtual review case-notes for patients attending the Luton and Dunstable Hospital from August 2021. Data was collected on patient demographics, the initial diagnostics sign-posting score and the virtual review outcome (the Glauc-Strat-Fast[1] category). A survey was used to determine the time taken to sign-post a single diagnostic data set.

Results: A total of 100 case-notes were reviewed. Sign-posting was performed by a combination of medical and non-medical members of staff including nurses, healthcare assistants, orthoptists and doctors. The time taken to signpost a single patient ranged from 30 seconds to 5 minutes. 77% of diagnostic signposting correlated with the final virtual review outcomes. In most cases where signposting was inaccurate, patients were signposted into a higher and more urgent category.

Conclusion: Use of this simple sign-posting tool could help to effectively organise the workforce for virtual review of glaucoma diagnostics and optimise the use of our limited workforce and other resources. Signposting decision making to the right clinicians may reduce the burden of lower risk decision making on senior clinicians and enable them to focus on the higher risk work. The signposting strategy enables appropriately trained members of the wider team to perform this work.
Further work is needed to evaluate the use of such a tool within a larger patient cohort.

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P2.67
Effect of repeated intravitreal injections in glaucoma spectrum diseases

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Purpose: To evaluate whether repeated intravitreal injections are associated with glaucomatous progression in eyes with glaucoma spectrum diseases.

Methods: Retrospective longitudinal study of patients with ocular hypertension (OHT), glaucoma suspects (GS) or definite glaucoma that received ≥ 8 total intravitreal injections per eye and had ≥ 2 SD-OCT RNFL thickness measurements at least 12 months apart, having received ≥1 intravitreal injection during the study period. We excluded eyes with poor OCT quality and if the baseline global RNFL thickness was < 50 µm. Our primary outcome was the variation in RNFL thickness. Linear mixed effects models were constructed, including a multivariable model.

Results: 118 eyes from 104 patients were included. Average baseline age was 70.75 ± 10.90 years with a follow-up of 39.91 ± 23.14 months. 41% of eyes had primary open angle glaucoma (POAG), 36% OHT or GS, 16% secondary OAG and 6% angle-closure glaucoma (ACG). 40% had exudative AMD, 26% venous occlusion, 25% diabetic macular edema and 9% other retinal disorders. Average number of intravitreal injections during the study period was 22.10 ± 14.19. RNFL thickness decreased significantly from 85.97 ± 20.14 to 79.70 ± 20.69 µm ($p < 0.001$; mean rate of -2.10 ± 7.36 µm/year), with no significant changes detected in visual fields MD ($p = 0.382$). There was a significant difference in RNFL variation among glaucoma spectrum diseases, with more thinning in eyes with secondary OAG (-11.24 ± 16.95 µm; -3.79 ± 6.19 µm/year), followed by POAG (-8.64 ± 14.39 µm; -3.35 ± 6.23 µm/year), ACG (-8.13 ± 11.08 µm; -3.78 ± 5.64 µm/year) and finally OHT/GS (-0.94 ± 15.69 µm; -0.04 ± 8.74 µm/year) ($p < 0.001$). A higher number of study time injections was significantly associated with higher RNFL thinning ($p = 0.008$). The proportion of eyes under glaucoma medical treatment increased from 73.7% to 82.2% ($p = 0.049$), as well as the average number of glaucoma medications per eye ($p = 0.018$); more eyes underwent selective laser trabeculoplasty ($p < 0.001$) and surgical implantation of tube shunts ($p = 0.002$). IOP decreased significantly from 18.64 ± 7.10 to 15.05 ± 4.04 mmHg ($p < 0.001$). In a multivariable linear mixed model, higher baseline RNFL thickness ($p < 0.001$), higher baseline IOP ($p < 0.001$), lower central corneal thickness ($p < 0.001$) and type of glaucoma spectrum disease ($p = 0.017$) significantly predicted higher RNFL thinning.

Conclusion: Routine optic nerve evaluations should be performed in patients undergoing regular intravitreal injections.

P2.68
Concordance of intraocular pressure values obtained with the iCare HOME 2 and Goldmann applanation tonometry in healthy subjects

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Purpose: The 'iCare HOME 2' is a handheld rebound tonometer used for self-measurements of the intraocular pressure (IOP) and the successor of the 'iCare Home 1'. Its principle and the drawbacks of the 'iCare Home 1' are described elsewhere. The concordance of IOP values obtained by 'iCare HOME 2' and the state-of-the-art Goldmann Applanation Tonometer (GAT) remains incompletely understood. We compared IOP values obtained with the two methods in healthy subjects with normal IOP.

Methods: The single center, prospective, cross-sectional study included 21 healthy participants who underwent IOP measurements of the right eye using the 'iCare HOME 2' and GAT. The mean IOP of six automatically performed 'iCare HOME 2' recordings was compared to a single GAT measurement. Concordance was visually assessed using a Bland-Altman plot and statistically examined using linear regression analysis. The difference between IOP values was the dependent and the average IOP of the two methods the independent variable.

Results: The mean IOP values of the 'iCare HOME 2' were 15.67 mmHg (SD 3.23) and 14.57 mmHg (SD 2.36) for the GAT (p = 0.124). The mean difference between 'iCare Home 2' and GAT was 1.095 mmHg (CI -0.329 to 2.520). The Bland-Altman plot indicated that the 'iCare Home 2' values tended to be smaller than corresponding GAT values in the lower spectrum of IOP measurements and higher than GAT in the higher end of the measurement spectrum [+0.44 mmHg (95%CI: -0.16 to 1.04); p = 0.143].

Conclusion: On average, the two IOP measurement methods produced similar IOP results in a small sample of healthy subjects. The analysis of concordance showed evidence for a proportionality bias revealing that differences between the two methods first tended to narrow down followed by an increase as the value of measurements increased. Considering that 'iCare HOME 2' tends to measure too low values at low readings and too high values at higher readings, the clinical consequences of this discordance to the GAT are not serious.

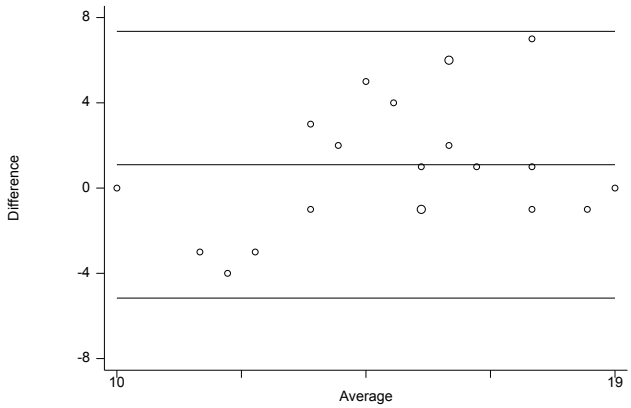

Figure 1: Bland Altman plot of 'iCare HOME 2' vs. GAT IOP readings.

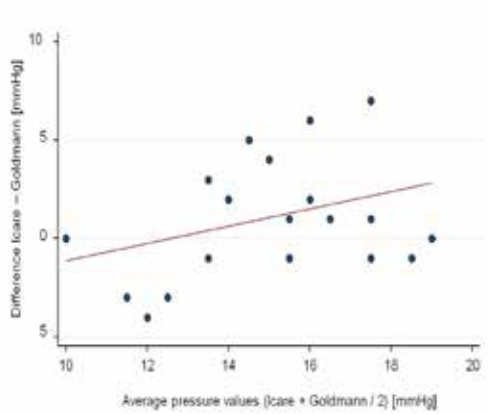

Figure 2: Scatter plot and regression line assessing the extent of proportionality bias between the two methods

P2.69
Ocular surface disease in virtual glaucoma clinic patients

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Purpose: Ocular surface disease (OSD) is common in glaucoma patients. With increasing adoption of virtual glaucoma clinics due to the Covid-19 pandemic and its effects on services, OSD may significantly affect patient adherence to treatment. We aimed to determine the prevalence of OSD in patients attending a virtual glaucoma clinic.

Methods: Prospective cohort study of 100 consecutive patients attending virtual glaucoma clinic at a tertiary academic hospital. Visual field (VF) testing was carried out in all patients and glaucoma severity was defined by the VF mean deviation (MD) in the worse eye. All patients completed the ocular surface disease index (OSDI) questionnaire, which was scored from 0 to 100, with higher scores indicative of more severe disease. The OSDI includes vision-related, ocular symptoms, and environmental triggers subscales, which were examined separately. Regression analysis was performed to examine the relationship between MD and OSDI scores.

Results: Patients had a median age of 72.5 years, with an average MD in the worse eye of – 5.47 dB. The average OSDI score was 11.38 (interquartile range 2.08 to 14.58). 20 patients (20%) had an OSDI score ≥20, indicating moderate disease or worse. 22 patients (22%) had an OSDI score of 0. Patients were using an average of 1.16 glaucoma medications. 17 patients were using preservative free drops. Worse MD was statistically significantly associated with poorer OSDI scores (p = 0.031).

Conclusion: Our cohort of virtual glaucoma clinic patients had a lower prevalence of OSD compared to existing published data. This may be due to the milder disease severity of our patient cohort and consequently, lower rates of medication use. Nonetheless, the significant proportion of patients reporting OSD and the association between OSD and worse MD argues the importance of OSD management in glaucoma patients. The OSDI may not be an ideal test in glaucoma due to the significant weightage on vision related symptoms which may be confounded by glaucoma. Further research should utilise other OSD scoring tools such as DEQ-5.

P2.70
Multiple MIGS: a retrospective comparative study

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Purpose: There is a significant scarcity in long-term outcomes from real-world settings on patients undergoing combined interventional glaucoma procedures. The optimal cluster of patients who would most likely benefit from such interventions, has yet to be identified or defined. We aimed to determine the efficacy and effectiveness of Phacoemulsification (phaco) +iStent implantation Versus (VS) Phaco+IStent+Endocyclophotocoagulation (ECP) over a 1-year period

Methods: Patients who underwent combined two Trabecular micro-Bypass iStent® (model GTS100, Glaukos corporation, California) insertion and cataract surgery or iStent® + Phacoemulsification + ECP were identified using Medisoft (Ltd) at Kings College Hospital NHS Foundation Trust between September 2018 and March 2020. Information on demographics including ethnicity, visual acuity, co-morbidities, pre-operative and post-operative ocular characteristics and form of intervention was recorded. The evaluated main outcome measures included intraocular pressure (IOP), number of drops, qualified success (percentage achieving 20% reduction +/- drops in IOP), complications, and the need for Diamox pre and post-intervention. Direct comparisons were made at all time points evaluated.

Results: A total of 78 patients were identified (ECP+Phaco+IStent:n = 53, Phaco+IStent: n = 25). Mean (SD) age was 74.23 (10.47), pre-operative cup-to-disc ratio (CDR): 0.79 (0.13), pre-operative IOP: 19.04 mmHg (5.95), number of drops pre-op 2.92 (0.96) with 58.97% (n = 46) being female. A total of 21.79% (n = 17) of patients were diabetic. No significant differences between the patient cohorts was identified apart from pre-op drops: ECP+Phaco+IStent: 3.24 (0.83), Phaco+IStent: 2.77 (0.99), p = 0.045). At month 1: 52%, 3: 48%, 6: 41% and year 1: 58% in the ECP+Phaco+IStent group achieved qualified success. This was in comparison to 43%, 38%, 40% and 58% for the respective timepoints in the Phaco+IStent group. At year 1 no significant differences were seen in the mean number of drops used (2.62 vs 2.68), mean IOP (14.46 vs 14.29) and mean IOP change from baseline (-4.11 VS -4.0). All patients were off diamox post-operatively.

Conclusion: Although a more significant immediate reduction in intraocular pressure is seen with the addition of an ECP procedure, our results would suggest similar outcomes at year 1 for both groups. Combining additional 'MIGS' procedures may not yield the long-term results expected and thus may not be warranted, sustainable and likely increases unnecessary cost burden on service.

P2.71
Long-term follow-up for patients with primary congenital glaucoma in Latvia

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Purpose: The aim of the study was to evaluate the long-term outcomes for patients with primary congenital glaucoma (PCG) treated surgically till the age of 12 months.

Methods: The retrospective study was conducted to analyse all patients diagnosed with PCG in the tertiary medical centre from 2003 till 2019. Preoperative data were evaluated. At the final visit best corrected visual acuity (BCVA), intraocular pressure (IOP), visual field and optical coherence tomography (OCT) were analysed.

Results: In the study 24 eyes of 20 patients were involved. The mean age of patients at the time of diagnosis was 6.5 ± 2.2 months. The average delay of the diagnosis was 1.8 ± 1.8 months. Before the surgery the mean IOP was 27.4 ± 6.0 mmHg, corneal diameter was 13.0 ± 1.0 mm and axial length was 22.4 ± 1.6 mm. Mean IOP after the surgery was 18.1 ± 7.4 mmHg, after 3 months 16.7 ± 5.2 mmHg, after 6 months 16.0 ± 6.1 mmHg, after 12 months 15.0 ± 3.3 mmHg. 12.5% of patients underwent a repeated surgical intervention. At the last follow-up after 106.0 ± 69.0 months, the mean IOP 15.1 ± 4.7 mmHg. 79.2% eyes were classified as absolute success (IOp < 21 mmHg, without eye drops), 12.5% were qualified success (IOp < 21 mmHg with eye drops), 8.3% were failure (IOP above 21 mmHg). BCVA was 0.6 ± 0.3 (range from light perception to 1.0, a decimal scale). 79.2% of eyes were diagnosed with amblyopia. The mean spherical equivalent at the last follow-up was -0.16 ± 3.3 dioptre. OCT was reduced for 50% of patients with the mean value of global retinal nerve fibre layer (RNFL) thickness 83.7 ± 15.8 µm. The mean deviation in the visual field was -2.3 ± 3.3 dB, the patter deviation -7.2 ± 5.2 dB.

Conclusion: Primary congenital glaucoma could be challenging to diagnose early. Long term follow-up is mandatory. Besides surgical treatment, correction of the refractive error and treatment of amblyopia affects long-term outcomes. In our study group 50% of patients had reduced RNFL thickness at the last follow-up.

P2.72
Association between vascular and structural parameters by optical coherence tomography angiography in primary congenital glaucoma

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Purpose: To determine the association of structural and vascular parameters using optical coherence tomography (OCT) angiography (-A), in patients diagnosed with primary congenital glaucoma (PCG). And to model the relationship between vascular and structural parameters.

Methods: 40 patients diagnosed with PCG were recruited (only one eye per patient was included). All study participants underwent a comprehensive ophthalmologic examination. Peripapillary and macular vascular measurements were obtained using AngioplexTM OCTA with a 4.5x4.5mm optic nerve head scan and 6x6mm macular scan. Structural parameters were collected: circumpapillary Retinal nerve fiber layer (cpRNFL) thickness (global and quadrants), ganglion cell-inner plexiform layer complex (GCL+IPL) thickness (average, minimum and sectors), rim area, average and vertical cup-to-disc (C/D) ratio, and cup volume. Local weighted scatterplot smoothing (LOWESS) and linear regression were used to model the relationship between vascular (flux index) and structural (cpRNFL thickness) variables.

Results: Global peripapillary values were: Mean flux index (FI) was 0.39 (0.05), mean perfusion density (pPD) was 42.57 (4.56) %, cpRNFL was 78.65 (22.50) microns, average c/p ratio was 0.59 (0.18). Global GCL+IPL thickness was 71.71 (14.81) microns,

and minimum GCL+IPL thickness was 64.18 (18.63) microns. Statistical correlation was found between peripapillary structural, vascular and morphologic parameters (all p < 0.023). No-linear model (FI = 5.48+7.36x10-3 cpRNFL-3.36x10-5 cpRNFL2) defined better the relationship between structural (cpRNFL thickness) and vascular (FI) damage in PCG. Considering the slope of change, FI decreases as cpRNFL decreases; moreover, a decrease of FI exists even with lower values of cpRNFL thickness (< 42 microns, slope = 4.5x10-3).

Conclusions: No-linear relationship between structural and vascular parameters in PCG was described. OCTA measurements could offer a useful and objective measurement of damage in early and severe congenital glaucoma, complementary to that offered by OCT.

P2.73
Macular and peripapillary Angio OCT in subjects affected by chronic open angle glaucoma with localized perimetric damage

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Purpose: To evaluate the diagnostic capacity of macular and peripapillary Angio OCT in glaucomatous patients with localized perimetric defect

Methods: We studied 51 eyes of 26 patients affected by primary open angle glaucoma with localized campimetric damage. Patients underwent perimetry standard white on white strategy 24/2 or 30-2 and Angio OCT examination of the macular and papillary region with scanning amplitude of 4. 5 x 4. 5 mm. The vascular texture of the superficial plexus corresponding to the layer of nerve fibers both in the papillary area and in the macular area.

Results: There was a sharp reduction in vascular texture in the glaucomatous eyes with a direct proportionality with the depth and extension of the perimetric defect. The Angio OCT reliefs have been put to comparison subsequently with a case-control group consisting of 10 eyes of 5 healthy patients without perimetric defect. The group of healthy patients does not had alterations of the vascular texture neither at the macular level nor at the level of the papillary area.

Conclusion: Our work highlights how, also by an anatomical point of view, there is an alteration in the retinal areas involved in the glaucomatous pathological processes.

P2.74
The forgotten follow up

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Purpose: To emphasize the important role of regular follow up examinations once glaucoma was diagnosed.

Methods: Case report: The case of a 72-year old female patient was studied. In this patient primary open angle glaucoma was diagnosed back in 2018. At this time the woman anamnestically had good vision in both of her eyes. When the patient showed up in our clinic in the end of September 2021 the BCVA was 0,7 for the right eye and Light Perception (LP) for the left eye. The Intraocular Pressure (IOP) was respectively 45 mmHG and 68 mmHg. The patient described strong pain in and behind the left eye, sensation of heaviness in the forehead and sometimes episodes of severe headache. At the time of presentation in our clinic the prescribed therapy was Luxfen (Brimonidine) 2x1 eye drop/day in both eyes and Cosimolol (beta blocker) 1x1 eye drop/day. The patient reported that she has not been "absolutely compliant" about her therapy. In the eye examination it was seen that both eyes were pseudophakic, showing scleral injection and edematous corneas. The left eye did not show any pupillary reaction to light and two iridotomies were observed. The right optic nerve showed a CDR of 0.6-0.7PD whereas the left one showed a total cupping. After initiating a therapy with Mannitol 10% 250 ml i.v. on 3 consecutive days we managed to lower the IOP to Tonus normalis for the right eye and to about 25-30 mmHg for the left eye. Additionally we replaced the existing therapy with Cosopt (Dorzolamide + Timolol), Luxfen (Brimonidine) and Xalatan (Latanoprost) and recommended a cyclocryotherapy for the left eye where no sufficient IOP-reduction could have been achieved with conservative therapy only.

Results: A few weeks after the initial presentation we performed the planned cyclocryotherapy in the left eye and could then reach satisfactory IOP-levels for both eyes.

Conclusion: Regular follow up examinations containing perimetry and OCT play a crucial role in the recognition of progression once glaucoma was diagnosed. This is the only way to assess if the actual therapy is sufficient or an escalation is needed.

P2.75
Glaucoma risk prediction in ocular hypertension (GRIP): a real world data study using electronic medical records to validate a risk predictor for conversion to glaucoma

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Purpose: Ocular hypertension (OHT) is a risk factor for POAG. The OHTS-EGPS model is available but its generalisability to a UK population is uncertain. The goals of this presentation are (1) to describe the protocol of the GRIP study that will validate and update a 5-year risk predictor of POAG in a UK population, and (2) to describe the baseline characteristics cohort. GRIP has been funded by NIHR-HTA (https://fundingawards.nihr.ac.uk/award/NIHR131808).

Methods: Retrospective data analysis of electronic medical records of OHT patients from 10 Hospital Eye Services (HES). Conversion to POAG will be defined as two consecutive and reliable visual fields (VFs) with Glaucoma Hemifield Test 'outside normal limits'. Risk factors to be explored: age, ethnicity, sex, IOP, vertical cup-to-disc ratio, central corneal thickness, VF pattern standard deviation, family history of glaucoma, systemic hypertension, diabetes mellitus, treatment, and OCT (global RNFL thickness). Primary outcome: conversion to glaucoma in at least one eye within 5 years.

Results: Model updating and validation: The OHTS-EGPS risk prediction model will be applied to calculate the predicted risk of developing glaucoma in 5 years for each patient. Model performance will be assessed in terms of discrimination and calibration (i.e. agreement between predicted and observed risk). Discriminative ability will be assessed using Harrell's c-index. Calibration plots of average observed risk against predicted 5-year risk will be used to assess calibration. Based on the outcome of the validation, we will update the model by adjusting the baseline risk, re-estimating regression coefficients, and exploring the addition of new candidate predictors. A description of the baseline characteristics of the cohort will be

presented.

Conclusion: An updated and validated risk prediction tool incorporating all relevant risk factors for glaucoma will inform effective and efficient OHT management.

P2.76
Comparison of iCare home rebound tonometry and clinic intraocular pressure measurement

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Purpose: To compare a single office intraocular pressure (IOP) measurement with diurnal IOP peaks in primary open angle glaucoma (POAG) and ocular hypertension (OH) patients who were recognised as high-risk patients for glaucoma progression and/or development.

Methods: Sixteen patients diagnosed with POAG and OH, with at least one year follow-up were recognised as high-risk patients for glaucoma progression and/or development and were enrolled into this prospective study. Patients were trained to perform self-tonometry every 2 hours during waking hours over a 24-hour period using the iCare home tonometer. IOP was assessed once with both the Goldmann Applanation Tonometer (GAT) and the iCare rebound tonometer when the patient returned the home tonometer the next day. The IOP peaks from the self-tonometry were compared with the clinic IOP results.

Results: A total of sixteen patients (mean age = 62 years; 56.25% males; 8 POAG; and 8 OH), were included in this study. Both GAT and iCare rebound tonometer IOPs were comparable for both eyes ($p > 0.05$ for all). Therefore, GAT IOP was subsequently compared with the home iCare IOP peaks to assess the differences between the clinic IOP and the diurnal IOP peak.
The iCare tonometer peaks were significantly higher than the GAT IOP for both eyes [right eye = 25.4 ± 5.4 mmHg and 18.8 ± 2.6 mmHg for iCare and GAT; left eye = 23.1 ± 5.4 mmHg and 18.4 ± 4.8 mmHg, for iCare and GAT, respectively; $p < 0.0001$ for both]. 10 (62.5%) patients who recorded normal range IOP in clinic had abnormally high IOP peaks on home tonometry in at least one eye regardless of topical therapy. 2 (12.5%) patients who recorded abnormally high GAT IOPs had much higher IOP peaks with home tonometry. 3 (18.75%) patients recorded normal IOP with both GAT and iCare but the iCare peaks were higher than the GAT values. Only one patient reported an iCare peak that was lower than the GAT IOP.

Conclusion: 24-hour IOP monitoring represents a valuable tool which can reveal high peaks than those observed during typical office hours. It can be used to establish baseline IOP in OH patients prior to treatment and to gauge the treatment effectiveness in POAG patients.

P2.77
Macular capillary perfusion density and macular vessel density in open angle glaucoma and ocular hypertension: a longitudinal study

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Purpose: To investigate prospectively macular vascular changes in patients with glaucoma and ocular hypertension[1,2], and to correlate these vascular changes with structural and functional outcomes.[3]

Methods: A 12-month prospective longitudinal study was performed with 124 open-angle-glaucoma-eyes (GE), 111 ocular-hypertension-eyes (OHE) and 98 gender and age matched control-eyes (CE). Glaucomatous progression was defined as a decrease of ³5µm in average or ³7µm in a sector of RNFL thickness.[4] Humphrey Field Analyzer3 and Angioplex HD OCT-Cirrus5000 were used. The statistical analysis was performed using the Mann-Whitney-Test and Spearman-Rank-Correlation.

Results: In OHE and GE groups, 21,7% of eyes showed progression, being the decrease of Macular Vessel Density (MVD) and Macular Capillary Perfusion Density (MPD) greater (-0,696mmÐ/mm² and -1,56%) compared to non-progressive eyes (0,527mmÐ/mm² and 1,55%) [$p < 0'001$ for all]. Fig. 1
Characteristics as increased vertical cup to disc ratio (CDV) (0,64 vs 0,57), elevated intraocular pressure (IOP) (18,25 vs 15,40 mmHg), thinner central corneal thickness (CCT) (520,18 vs 541,67 µm) and lower ocular perfusion pressure (OPP) (47,81 vs 48,95 mmHg) were significantly different in those progressive OHE and GE [$p < 0'05$ for all]. Nevertheless, minimum ganglion cell layer thickness (GCLM) was only significantly lower in progressive GE (58,51 vs 73,98 µm) [$p = 0'036$].
Regression analysis showed that MVD change was low correlated with changes of Retinal Nerve Fiber Layer thickness (RNFL) (r = +0,280), Ganglion Cell Layer thickness (GCL) (r = +0,188), Visual Field Index (VFI) (r = +0,231) and Visual Field Mean Deviation (VFMD) (r = +0,278). MPD was also low correlated with RNF change (r = +0,260) and GCL change (r = +0,154) [$p < 0,001$ for all]. Fig. 2

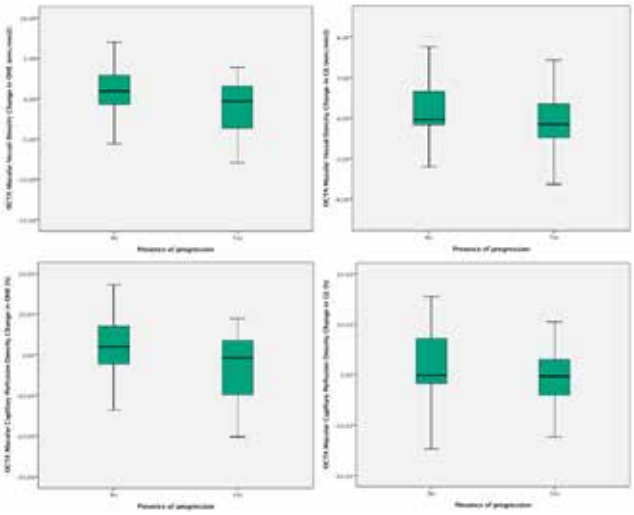

Figure 1. Box-plots showing MVD and MPD changes in OHE and GE with and without progression

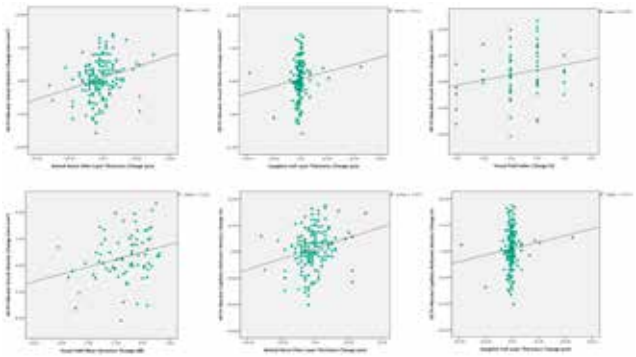

Figure 2. Scatter-plots showing correlation between MVD and MPD changes, and progression of structural and functional parameters.

Conclusion: Data showed that when glaucomatous progression took place, stronger vascular changes occurred in the macular area, as greater decrease of MVD and MPD. These changes seemed to be correlated with traditional glaucoma parameters such RNFL, GCL, VFI and VFMD. Furthermore, common characteristics as increased CDV and IOP, lower OPP and GCLM, and thinner CCT seemed to be risk factors for those eyes that eventually showed progression. Nevertheless, further research with larger population and larger follow-up is needed to obtain stronger results.

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P2.78
Pigmentary open-angle glaucoma in Leber's hereditary optic neuropathy: case report

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Purpose: To describe a case of pigmentary open-angle glaucoma with rapid progression associated with Leber's hereditary optic neuropathy (LHON).

Methods: Single case report and retrospective analysis of written medical records.

Results: A 24-year-old male was admitted to the hospital due to a 3-month history of progressive visual loss that had worsened over the previous days. Ophthalmological examination revealed a best corrected visual acuity (BCVA) of counting fingers in the right eye (RE) and 20/200 in the left eye (LE) along with a lack of color perception demonstrated by Ishihara plates and a central scotoma in the visual field (VF) of both eyes. The dilated fundus examination was normal. Genetic counselling revealed a mitochondrial DNA mutation compatible with the diagnosis of LHON. After two years, the patient developed high intraocular pressure (IOP) (range 21-38 mmHg) and the BCVA had dropped to counting fingers in both eyes. The fundus examination showed progressive bilateral enlargement of the disc cupping of the optic nerves with sectorial excavation and reduction of the neural rim, confirmed by optical coherence tomography (OCT). VF demonstrated a bilateral progressive central scotoma in both eyes accompanied by an inferonasal defect in the LE. Gonioscopy showed a Shaffer grade IV angle with a homogeneously dark brown trabecular meshwork. The patient was started on maximal medical therapy and subsequently submitted to bilateral deep sclerectomy with intraoperative mitomycin C. At present, the IOP remains normal without medical therapy (range 8-12 mmHg) and the glaucoma has not progressed further according to OCT and VF. His BCVA, however, has been decreasing and is currently hand motion in the RE and counting fingers in the LE.

Conclusion: Our case report suggests that glaucomatous optic neuropathy and LHON may have a cumulative effect on retinal ganglion cell damage with a consequent faster progression of visual loss. As the majority of these patients is very young, extra attention must be paid to prevent further cell injury. We also highlight the limitation of ancillary testing interpretation, especially OCT and VF, for assessment of glaucoma progression in patients with LHON.

P2.79
Ab-interno canaloplasty standalone versus combined with cataract surgery - 36-month outcomes in 1000+ eyes

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Purpose: To investigate the clinical outcomes of ab-interno canaloplasty with the iTrack microcatheter (Nova Eye Medical) as a standalone procedure (ABiC) and in combination with phacoemulsification (ABiC+phaco) over a 36-month period.

Methods: Non-randomized, single center, retrospective case series of eyes undergoing either ABiC or ABiC+phaco. Adult patients with controlled and uncontrolled open-angle glaucoma and no prior ABiC+phaco. Adult patients with controlled and uncontrolled open-angle glaucoma and no prior glaucoma surgery were eligible for inclusion. Outcome measures include intraocular pressure (IOP) and number of glaucoma medications.

Results: 1013 eyes (335 ABiC and 678 ABiC+phaco) were included. Mean baseline IOP was 21.7 ± 7.1 mmHg (ABiC) and 18.5 ± 7.3 mmHg (ABiC+phaco) and glaucoma medication number was 2.11 ± 1.17 (ABiC) and 1.72 ± 1.13 (ABiC+phaco). There was a statistically significant difference among the groups at baseline ($p < 0.001$). At 36 months, mean IOP was reduced to 17.0 ± 4.0 mmHg ($n = 10$) and 14.4 ± 3.3 mmHg ($n = 41$) respectively, and mean number of medications was reduced to 1.42 ± 0.90 ($n = 12$) and 0.88 ± 1.13 ($n = 42$) respectively with no significant statistical difference between groups ($p = 0.18$; $p = 0.44$). Ninety-nine eyes experienced adverse events such as postoperative IOP spikes; 7 eyes had complications.

Conclusion: ABiC results in a sustained reduction in mean IOP and glaucoma medications when used as a standalone procedure or in combination with phacoemulsification. ABiC as a standalone procedure or in combination with phacoemulsification provides a safe and efficacious way of lowering IOP and reducing medication burden.

P2.80
Plasma rich in growth factors as an adjuvant agent in non-penetrating deep sclerectomy

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Purpose: To evaluate the utility and safety of plasma rich in growth factors (PRGF) eye drops in the postoperative treatment of non-penetrating deep sclerectomy (NPDS).

Methods: Retrospective case-control study, which included patients with open-angle glaucoma. Cases were prospectively and consecutively recruited, and used topical PRGF for 4 months after NPDS. Historical controls were patients who had undergone the same technique immediately before the start of the study (without PRGF). Prior to surgery, intraocular pressure (IOP), the number of topical hypotensive medications, and visual field mean deviation (MD) were registered. Postoperatively (1 week, 3 months and 6 months), those three variables were also analysed, as well as complications, manipulations and reinterventions.

Results: Preoperatively, the PRGF group (n = 37) and the control group (n = 49) were similar in age (70.9 ± 10.0 vs 71.5 ± 10.7 years; p = 0.68), IOP (23.0 ± 9.0 vs 20.6 ± 10.2 mmHg; p = 0.26), MD (-15.0 ± 8.8 vs -15.9 ± 7.8 dB; p = 0.76) and the number of hypotensive drugs (2.8 ± 0.9 vs 2.7 ± 0.8; p = 0.40). IOP significantly decreased at all follow-up visits in both groups, compared to the preoperative values. That reduction was greater at 6 months with PRGF (p < 0.01): 10.9 ± 4.3 mmHg (-52.6%) vs 15.0 ± 8.0 mmHg (-27.2%). In the final analysis, the number of drugs similarly reduced in both groups (p = 0.32). MD showed no significant differences. Surgical complications were observed in 12 control eyes (25%) and 5 eyes (14%) treated with PRGF (p = 0.06). No specific complications related to the use of PRGF were identified. The needling rates were 9.4% and 5.9% in PRGF and controls, respectively (p = 0.58). 3 eyes (6.3%) required further glaucoma surgery in the control group, and 1 (2.7%) in the PRGF-group (p = 0.78). The final complete success rate was higher with PRGF: 83.8% vs 60.4%.

Conclusion: Topical PRGF seems to reduce IOP and complications rate in the mid-term after NPDS, as well as the need for early manipulations, thus it may be considered as a possible safe adjuvant agent in order to achieve surgical success.

P2.81
Intra-ocular pressure response to dexamethasone implant injections in patients with a history of filtering surgery: the TRABEX study

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Purpose: Macular edema can occur in glaucomatous patients and lead to severe vision loss if untreated. In cases of no effective alternative therapies, dexamethasone implant (DEX-I) injections can be the only choice of treatment, despite a possible increase of intraocular pressure (IOP) under steroids. However, little is known on the IOP response following DEX-I in an eye with a history of filtering surgery. The aim of this series was to evaluate the IOP response, and the type and the number of additional procedures following DEX-I after conventional filtering surgeries and microinvasive glaucoma surgeries (MIGS).

Methods: An observational, retrospective, monocentric, consecutive series was conducted in the Ophthalmology department of the Croix-Rousse University Hospital in Lyon, France. A database search was performed to include eyes with filtering surgeries who then received DEX-I intravitreal therapy between January 2017 and December 2021. All the filtering surgeries were associated with 0.2 mg/mL diluted by half or not Mitomycin subconjunctival perioperative injection. This research was conducted in accordance with the Declaration of Helsinki.

Results: A total of 25 eyes of 21 patients were included. A total of 64% of the eyes did not experience OHT during the follow-up. An additional lowering-therapy was needed to control IOP for 32% of eyes and 20% of eyes required an additional glaucoma surgery.

Conclusion: In case of no alternative therapies to treat macular edema in patients with a history of filtering surgery, DEX-I can be proposed with generally manageable hypertension. Patients who previously underwent conventional therapy with effective blebs obtained better IOP control after DEX-I injections and for most of them, did not require any additional IOP-lowering therapy or surgery.

P2.82
Changing prevalence of glaucoma-related vision loss in Europe over the last 20 years: findings from the Global Vision Database of the Vision Loss Expert Group

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Purpose: To estimate prevalence of blindness and vision impairment due to glaucoma in 2020 and to examine change over the last 20 years, the period of the VISION 2020: The Right to Sight WHO Initiative.

Methods: A systematic review and meta-analysis was conducted of population-based datasets relevant to glaucoma moderate to severe vision impairment (MSVI) and blindness from 1980. Hierarchical models were fitted to estimate- by age, country, and year- the 2020 prevalence of MSVI (presenting visual acuity worse than 6/18 to 3/60 inclusive) and blindness (presenting visual acuity worse than 3/60). Percentage change in crude prevalence was calculated for European regions among adults aged 50 years and older between 2000 and 2020. Ninety-five percent uncertainty intervals (UI) were calculated.

Results: In 2020, an estimated 439,000 (343,000-548,000) people were blind due to glaucoma in Western Europe, 105,000 (83,000-127,000) in Eastern Europe, and 38,000 (29,000-48,000) in Central Europe. The ratio of females:males affected was 1.2, 1.5.

1.1, respectively, For MSVI, 264,000 (204,000-342,000; 1.4:1), 130,000 (103,000-165,000; 2.0:1), 52,000 (40,000-67,000; 1.3:1) people were affected, respectively. Age-standardised prevalence of glaucoma blindness among those aged 50+ years was 0.18% (0.14-0.23), 0.13% (0.11-0.16), 0.07% (0.06-0.09), 0.20 (01.6-0.25) in Western, Eastern, Central Europe, World, resp, and the female:male ratio, 0.9:1, 0.7:1, 0.7:1, 0.7:1, resp. For MSVI: 0.11% (0.08-0.14), 0.16% (0.13-0.21), 0.10% (0.08-0.13), 0.23% (0.18-0.29), with F:M ratios of 1.0:1, 0.9:1, 0.9:1, 0.8:1, resp. Between 2000 and 2020, although absolute numbers of glaucoma blind cases increased in Europe, the age-standardised prevalence of glaucoma blindness decreased in Western, Central and Eastern Europe by 12%, 39% and 25%, respectively. Smaller reductions were noted for MSVI: 0.8%, 1.9%, 2.5%.

Conclusion: There is an ongoing reduction in the age-standardised prevalence of blindness and VI due to glaucoma, yet the growth and ageing of the Europe's population is causing a substantial increase in number of people affected. After adjusting for age, males are more commonly affected by glaucoma blindness and MSVI. Notable inter-regional and sex inequalities exist which highlight the need to scale up vision impairment alleviation efforts at all levels.

P2.83
Glaucoma conversion of the contralateral eye in unilateral normal-tension glaucoma patients: a 5-year follow-up study

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Purpose: To investigate clinical characteristics and risk factors for glaucoma conversion of the contralateral eye in unilateral normal-tension glaucoma (NTG) patients.

Methods: A retrospective observational cohort study was conducted on a total of 76 subjects who had been diagnosed with unilateral NTG at the baseline and followed up for more than 5 years. Glaucoma conversion in the contralateral eye was defined as increased thinning of neuro-retinal rim, development of retinal nerve fibre layer defect and/or development of glaucomatous visual field defect.

Results: During the mean follow-up period of 7.3 ± 2.4 years, 21 of 79 (26.6%) subjects were confirmed to have developed glaucoma in the non-glaucomatous contralateral eye. The 5-year rate of glaucoma conversion in contralateral eyes was 19.7%. The maximum width of Ð-zone parapapillary atrophy (MWÐPPA) -disc diameter (DD) ratio at the baseline and the presence rate of disc haemorrhage during follow-up period were significantly greater in the contralateral eyes of the conversion group than in those of the non-conversion group (p = 0.011, < 0.001, respectively). A multivariate Cox-proportional hazard model revealed intraocular pressure (IOP) over 17 mmHg (HR 5.05, p = 0.031), central corneal thickness (CCT) under 491 μm (HR 4.25, p = 0.025) and MWβPPA-DD ratio over 0.32 (HR 6.25, p = 0.003) in contralateral eye at the baseline as the independent risk factors for glaucoma conversion.

Conclusion: Among unilateral NTG patients, those with low CCT and high MWÐPPA-DD ratio as well as high IOP in the contralateral eye are more likely to develop glaucoma in that eye during long-term follow-up.

P2.84
Intraocular pressure fluctuation and rates of visual field progression in primary open-angle glaucoma: an exploratory analysis from the United Kingdom Glaucoma Treatment Study (UKGTS)

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Purpose: The role of intraocular pressure (IOP) fluctuation in glaucoma progression remains controversial. We investigate whether IOP fluctuation is independently associated with the rate of visual field (VF) progression.

Methods: Participants from the UKGTS with ≥ 5 VFs were included. Associations between IOP metrics and the mean deviation (MD) rate of progression (RoP) were tested with mixed models. The variables of interest were mean ocular pulse amplitude (OPA), and standard deviation (SD) of diurnal IOP (diurnal fluctuation) and of IOP at all visits (long-term fluctuation). The effect of correlated IOP metrics (Fig. 1) and multicollinearity were controlled with a principal component analysis of peak and mean IOP during the trial, and baseline (untreated) IOP. The first principal component (PC1) was included as a model covariate. Interactions between variables of interest and time from baseline modelled the variables' effect on the RoP. Analyses were conducted separately in the two arms.

Results: 213 patients in the placebo arm (mean ± SD age: 66.5 ± 10.3 years) and 217 patients in the treatment arm (mean ± SD age: 65.2 ± 10.4 years) were included. The median [IQR] of mean IOP, diurnal and long-term fluctuation were, respectively, 18.4 [16.0-21.9], 1.4 [0.9-2.0] and 2.1 [1.6-2.9] mmHg in the placebo arm, and 15.2 [13.2-17.1], 1.3 [0.8-1.7] and 1.9 [1.4-2.6] mmHg in the treatment arm. Mean ± SD RoP were -0.32 ± 0.65 and 0.03 ± 0.58 dB/year in the placebo and treatment group, respectively. In the univariable analysis, diurnal and long-term IOP fluctuations were significantly associated with RoP in the placebo arm (p < 0.001), and longterm fluctuation in the treatment arm (p = 0.047). PC1, combining information of baseline, mean and peak IOPs, were significantly associated with RoP in the placebo (p = 0.029) but not in the treatment arm (p = 0.95). In the multivariable model, diurnal (placebo estimate: 0.047 dB/year, p = 0.60; treatment estimate: 0.046 dB/year, p = 0.63) and long-term IOP fluctuations (placebo estimate: -0.124 dB/year, p = 0.16; treatment estimate: -0.119 dB/year, p = 0.63) were not significantly associated with the RoP (Fig. 2). OPA was also not associated with RoP (p ≥ 0.11).

Conclusion: This study confirms that IOP fluctuation is not an independent factor for glaucoma progression and other aspects of IOP may be more informative.

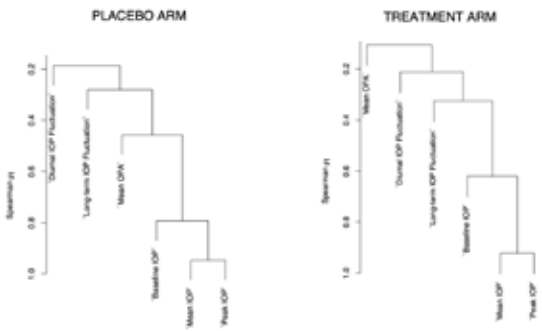

Figure 1. Hierarchical cluster analysis showing the degree of correlation among the various IOP metrics.

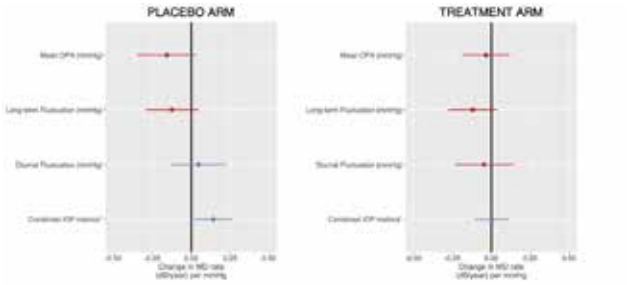

Figure 2. Forest plot showing the effect of each covariate on the change in MD rate of progression. * combined IOP metrics is a unitless variable combining baseline IOP, mean IOP, and peak IOP through principal component analysis.

Poster Session 3

COVID-related clinical experience | Genetics | Treatment - Surgery/Laser

P3.01 A genome-wide association study for a corticosteroid-induced increase in intraocular pressure after using topical corticosteroids
Ilona Liesenborghs, van Beek Daan, Adriaens Michiel, Tos Berendschot, Theo Gorgels, Iris Boesten, Michiel Cornelissen, Wishal Ramdas, Rudy Nuijts, Henny Beckers, Carroll Webers, Lars Eijssen, Jan Schouten *(The Netherlands)*

P3.02 Ocular severe involvement in oculofaciocardiodental syndrome: description of a case series
Ana Filipa Moleiro, Joana Santos Oliveira, Augusto Magalhães, Pedro Alves Faria, Fernando Falcão-Reis, Sérgio Estrela Silva *(Portugal)*

P3.03 Genetics of congenital glaucoma in 31 Bulgarian patients
Neda Sergeeva, Stanislava Kostova, Kunka Kamenarova, Nevyana Veleva, Alexander Oscar *(Bulgaria)*

P3.04 Axenfeld-Rieger syndrome associated glaucoma
Yoanna Kaneva, Nevyana Veleva, Alexander Oscar *(Bulgaria)*

P3.05 MYOC gene mutation associated POAG: a study in two families of Czech origin
Andrea Vergaro, Marek Fichtl, Lucie Rezková, Jana Jedlicková, Lubica Dudakova, Petra Lišková *(Czech Republic)*

P3.06 Retrospective analysis of telematic glaucoma clinic as a consequence of COVID-19 pandemic
Pau Romera Romero, Adrián Sánchez-Fortún Sánchez, Jéssica Botella García, Andres Fernandez-Vega-Cueto, Jordi Loscos Arenas *(Spain)*

P3.07 Remote glaucoma patients postoperative follow-up using mobile gadgets
Galina Vashkevich *(Belarus)*

P3.08 Optic nerve head changes measured with optical coherence tomography angiography in COVID-19 patients one year after infection
Beatriz Rodriguez Aguado, Elizabeth Salcedo Mafla, Bárbara Delás Alos, Mamen Carmona Orozco Mouafk Asaad *(Spain)*

P3.09 Effect of the COVID-19 pandemic on progression to glaucoma surgery in patients followed up in a retina unit
Mustafa Kalayci, Birumut Gedik, Elcin Suren, Muhammet Kazim Erol *(Turkey)*

P3.10 Peripheral laser iridoplasty in chronic narrow-angle glaucoma: anatomical results examined by sd anterior segment OCT
Massimo Savastano *(Italy)*

P3.11 Difference in safety profile and intraocular pressure (IOP) changes during Ziemer LDV Z8 femtosecond laser pretreatment of cataract between eyes with primary angle closure disease and normal eyes
ZhuLi Yap, Wesley Chong, Tina Tzee Ling Wong *(Singapore)*

P3.12 Surgical management of primary angle-closure glaucoma
Juan Carlos Izquierdo Villavicencio, Ariadne Cortes, Marta Hadid Dra, Mirel Rincon Sanchez *(Peru)*

P3.13 Laser iridotomy versus combined phacoemulsification and viscogonioplasy in treatment naïve primary angle closure patients: results from a tertiary centre in the UK
Suresh Thulasidharan, Aby Jacob, Francesco Stringa *(United Kingdom)*

P3.14 Results after treatment with MicroShunt Preserflo® of refractory to medical treatment congenital glaucoma in a patient with mycosis fungoides included in clinical trial ASTX660
Marta Fernandez, Laura Guerrero, Irene Platas, Jacobo Herrera, Pedro Salva *(Spain)*

P3.15 Evaluation of risk factors for failure in primary congenital glaucoma patients with 360 degree Ab externo suture trabeculotomy
Serhat Imamoglu, Yucel Ozturk, Süleyman Kugu *(Turkey)*

P3.16 Challenges in artificial drainage system implantation in pediatric advanced secondary glaucoma
Anca Pantalon, Crenguta Feraru, Marius Giurgica, Dorin Chiselita *(Romania)*

P3.17 Long term outcomes of primary deep sclerectomy in primary congenital glaucoma
Abdullah Bin Hemid, Ibrahim Aljadaan, Konrad Schargel, Adi Al Owaifeer, Ibrahim Al Obaida, Syed Khabir Ahmad, Mohanad Al Jetaily, Dr Eman AlHussain *(Saudi Arabia)*

P3.18 Effectiveness and safety of the gel stent versus trabeculectomy in patients with primary open angle glaucoma: a 12-month randomized, multicenter study
Inder Singh[1], Vanessa Vera[2], Arhsam Sheybani[2], Gagan Sawhney[2], Xuemin Gu[2], Mark Gallardo[2] *([1]USA, [2]Venezuela)*

P3.19 Surgical outcome comparison between initial trabeculectomy and Ex-Press in terms of achieving an intraocular pressure of < 15 and 18 mmHg: a retrospective single center comparative study
Shunsuke Nakakura, Ryo Asaoka *(Japan)*

P3.20 Eight-year outcomes of two first-generation trabecular micro-bypass stents (iStent) with phacoemulsification in primary open-angle glaucoma
Ali Salimi, Harrison Watt, Paul Harasymowycz *(Canada)*

P3.21 The LiGHT trial 6-year follow-up results
Gus Gazzard[1], Evgenia Konstantakopoulou[1,2], Mariam Adelenke[1], Gareth Ambler[1], David Garway-Heath[1], Victoria Vickerstaff[1], Neil Nathwani[1] *([1]United Kingdom, [2]Greece)*

P3.23 Corneal endothelial cell loss after phacoemulsification and YAG-laser activation of trabecula in primary open-angle glaucoma and co-existing cataract
Tatiana Sokolovskaya, Valeriya Gutnik *(Russian Federation)*

P3.24 Surgical outcomes of Xen45 gel stent implantation with the open conjunctiva approach in patients with primary open-angle glaucoma: a retrospective comparative study
Sangwoo Moon, Jiwoong Lee *(South Korea)*

P3.25 Minimally invasive glaucoma surgery with three generations trabecular micro-bypass implants in combination with cataract surgery for glaucoma: results after 1 year
Henny Beckers, Lotte M.J. Scheres, Ronald de Crom *(The Netherlands)*

P3.26 Intraoperative use of free conjunctival autograft in trabeculectomy due to acute conjunctival contraction
Dimitrios Alonistiotis, Antonios Manolakis, Dimitra Oikonomou, Petko Hristov, Panagiotis Theodossiadis *(Greece)*

P3.27 The long term effect of ciliary body diode (cyclodiode) ablation on visual acuity in glaucoma patients
Jack West, Abhay Ghaiwal, Wai Siene Ng *(United Kingdom)*

P3.28 Combined excimer laser trabeculostomy and phacoemulsification: three-year follow-up of intraocular pressure-lowering effect and endothelial cell loss
Eva Gonzalez Aquino, Antonio Moreno Valladares, Teresa Prieto Moran, Nieves Puerto Amorós, Francisca Gonzalez López, Mónica Martínez Díaz *(Spain)*

P3.29 Safety and efficacy of PreserFlo MicroShunt in refractory glaucoma, a one year study
Antoine Labbe, Alexandre Majoulet, Pascale Hamard, Emmanuelle Brasnu-De Cenival, Christophe Baudouin *(France)*

P3.30 Effectiveness and safety of the XEN 45 Gel Stent as a minimally invasive glaucoma surgery device in the management of open-angle glaucoma
Simon Neary, Edward Dervan *(Ireland)*

P3.31 Goniotome I/A in the treatment of primary open-angle glaucoma
Antonios Manolakis, Dimitra Oikonomou, Maria Kouvari, Aggeliki Androu, Petko Hristov, Dimitrios Alonistiotis *(Greece)*

P3.32 Hydrus microstent for patients with primary open-angle glaucoma combined with cataract surgery: primary results from a retrospective case series in England
Mohamed Elghobaier, Georgios Chatzithanasis, Symeon Nicolaou, Yunfei Yang, Mahmoud Radwan, Achyut Mukherjee, Chrysostomos Dimitriou *(United Kingdom)*

P3.33 Efficacy and safety of phacoemulsification associated with iStent Inject W® in patients with controlled open-angle glaucoma
Yanis Louanchi, Emmanuelle Brasnu-De Cenival, Pascale Hamard, Vittoria Aragno, Christophe Baudouin, Antoine Labbe *(France)*

P3.34 A prospective, 24-month evaluation of subjects with mild to moderate open-angle-glaucoma treated with the OMNI® surgical system as standalone procedure
Karsten Klabe, Andreas Fricke *(Germany)*

P3.35 PreserFlo MicroShunt - the better trabeculectomy? Our long-term results with the microshunt in surgical glaucoma therapy
Jan Philipp Werth, Andreas Fricke, Karsten Klabe *(Germany)*

P3.36 5 years-results of combined cataract surgery with iStent Inject W® in patients with cataract and open angle glaucoma
Hakan Kaymak, Andreas Fricke, Karsten Klabe *(Germany)*

P3.37 Long-term survival analysis of the effectiveness of PreserFlo MicroShunt in open-angle glaucoma patients
Cristina Ginés Gallego, Antonio Pascual-Santiago, Jacobo E. Enríquez-Fuentes, Jose Martinez-de-la-Casa, Julian Garcia Feijoo *(Spain)*

P3.38 Dual blade goniotomy in addition to usual fenestrating slits to enhance early intraocular pressure lowering in non-valved aqueous shunt surgery for primary open angle glaucoma
Mary Qiu, Saira Khanna, June Si, Christos Theophanous *(USA)*

P3.39 Effect of Kahook Dual Blade (KDB) ab-interno trabeculectomy on tonographic outflow facility compared to iStent Inject
Thomas Sherman, Anindyt Nagar, Saurabh Goyal, Emily Dowse, Elizabeth Galvis, Andrew Amon, Shireen Ognjenovic, Pouya Alaghband, Sheng Lim *(United Kingdom)*

P3.40 3-year outcomes of excisional goniotomy with the Kahook Dual Blade for glaucoma in Bolivia
Manuel Justiniano *(Bolivia)*

P3.41 Effects of socioeconomic status on baseline values and outcomes at 24 months in the treatment of advanced glaucoma study (TAGS)
Anthony King, Jemma Hudson, Augusto Azuara-Blanco, James Kirwan, K. Sheng Lim, Saurabh Goyal, Graeme MaClennan *(United Kingdom)*

P3.42 Early results of irrigating goniectomy with TrabEx+: a novel device for the treatment of open-angle glaucoma
Haoyu Wang, Daniel Gosling, Graham Auger *(United Kingdom)*

P3.43 Double is better than one
Mauro Fioretto, Matteo Orione, Andrea Grosso *(Italy)*

P3.44 Will the PreserFlo™ MicroShunt replace trabeculectomies? Results of a UK and Éire Glaucoma Society (UKEGS) Survey
Matthew Kuet, Anthony King, Augusto Azuara-Blanco, Keith Barton *(United Kingdom)*

P3.45 Trabecular microbypass iStent Inject W implantation combined with cataract surgery in open-angle glaucoma eyes - 12-month outcomes
Ismael Bakkali El Bakkali, Elena Pardina, Ana Boned-Murillo, Pablo Cisneros, Eva Josefina Núñez Moscarda, José Ignacio Sánchez Marín, Itziar Pérez, Juana Martinez, Juan Ibañez *(Spain)*

P3.46 Canaloplasty and trabeculotomy with the OMNI system in pseudophakic patients with open-angle glaucoma: the ROMEO II study
Jaime Dickerson, Kavita Dhamdhere, Daniel Terveen *(USA)*

P3.47 Trabeculectomy versus the PreserFlo MicroShunt: a comparison of their efficacy and safety at Addenbrooke's Hospital, Cambridge University Hospitals (CUH) NHS Foundation Trust
Disha Singhania, Tasneem Khatib, Geoffrey Chan, John Britton, Stylianos Georgoulas, Fiona Lim, Sherif Mohamed, Humma Shahid, Ian Tapply, Rupert Bourne *(United Kingdom)*

P3.48 Changes in corneal endothelial cell density after aqueous shunt surgery and trabeculectomy in patients of Black African or African-Caribbean origin: 1 year follow-up
Andrew Swampillai, Pirro Hysi, Irfan Versi, Anindyt Nagar, Emily Dowse, Andrew Amon, Elizabeth Galvis, Sheng Lim *(United Kingdom)*

P3.49 Trabeculectomy versus XEN gel implant for the treatment of open-angle glaucoma: a 4-year retrospective analysis
Ilaria Di Mola, Francesca Cappelli, Carlo Alberto Cutolo, Chiara Pizzorno, Carlo Traverso *(Italy)*

P3.50 Micropulse laser trabeculoplasty (MLT): a promising treatment for open angle glaucoma
Eirini-Christina Christodoulaki, Athina Athanasiou, Konstantina Mouriki, Dimitra Kavroulaki, Michael Zentelis *(Greece)*

P3.51 Surgical outcomes of ab interno viscocanaloplasty (ABIC) combined with cataract surgery in open-angle glaucoma: 36-month results
Kevin Gillmann[1], Jean-Marc Baumgartner[2], Laëtitia Niegowski[2] *([1]United Kingdom, [2]Switzerland)*

P3.52 XEN-augmented deep sclerectomy: surgical outcomes and comparison with non-penetrating deep sclerectomy at 6 months
Kevin Gillmann[1,2], Jean-Marc Baumgartner[2], Laëtitia Niegowski[2] *([1]United Kingdom, [2]Switzerland)*

P3.53 8-year follow-up of excimer laser trabeculostomy (ELT): clinical outcomes
Michael S. Berlin, Ryan Lamrani, Anne Nguyen, Rebecca Doan, Emily Chen, Brian Simon, Jonathan Shakibkhou, Sylvia Groth *(USA)*

P3.54 Choroidal effusion and hypotony maculopathy after PreserFlo MicroShunt
Irena Serov-Volach, Chris Panos *(United Kingdom)*

P3.55 Shallow anterior chamber as a complication after trabeculectomy in a patient with primary open angle glaucoma and chronic anterior uveitis
Kristina Belcheva *(Bulgaria)*

P3.56 Surgical outcomes of Schlemm's canal peeling in eyes with open-angle glaucoma
Alev Ozcelik Kose, Raziye Donmez Gun, Serhat Imamoglu, Süleyman Kugu *(Turkey)*

P3.57 Long term survival of filtering bleb after trabeculectomy surgery in cataract patients
Aliki Liaska *(Greece)*

P3.58 Efficacy of phacoemulsification and phacoemulsification in combination with goniosynechiolysis in the surgical treatment of chronic angle-closure glaucoma: 2-years study
Ihor Novytskyy, Rostyslav M. Lopadchak *(Ukraine)*

P3.59 Long-term effectiveness and safety of early lensectomy in patients with pseudoexfoliation
Ignacio Rodriguez-Una, Pedro Pablo Rodriguez-Calvo, Montserrat García, Andres Fernandez-Vega-Cueto, José Alfonso *(Spain)*

P3.60 Micropulse transscleral cyclophotocoagulation (MP-TSCPC) in patients with glaucoma and ocular cicatricial pemphigoid
Celina Logioco, Noelia Podesta, Leila Galetto, Azul Rodriguez Libarona, Florencia Valvecchia, Virginia Zanutigh *(Argentina)*

P3.61 PreserFlo MicroShunt for secondary glaucoma in patients with hereditary transthyretin amyloidosis: initial results
ElodieDa Cunha, EmmanuelBarreau, JérômeJoffre, Pierre-EmmanuelRemongin, NicolasMesplié, Marc Labetoulle, Antoine Rousseau *(France)*

P3.62 PreserFlo MicroShunt® implanted in a patient with a bilateral scleromalacia perforans
Adrián Sánchez-Fortún Sánchez, Pau Romera Romero, Jéssica Botella García, Marta Balboa, Jordi Loscos Arenas *(Spain)*

P3.63 From one tube to another. Exchanging an Ahmed valve for a Baerveldt shunt in a secondary glaucoma
Chryssa Terzidou, Alexandra Trivli, Georgios Dalianis *(Greece)*

P3.64 Non-penetrating deep sclerectomy with Nd:YAG laser goniopuncture versus trabeculectomy in patients with secondary glaucoma after silicone oil removal
Maryna Karliychuk, Serhii Pinchuk *(Ukraine)*

P3.65 Prompt primary cyclophotocoagulation with subsequent aqueous shunt as needed for neovascular glaucoma with synechial angle closure
Jessie Wang, Mary Qiu *(USA)*

P3.66 Clinical outcomes of Ahmed glaucoma valve implantation in secondary glaucomas at Hospital Pedro Hispano
Rita Basto, Renato Barbosa, Rita Viana, Alexandre Silva, Carolina Vale, Rita Gonçalves, Ricardo Bastos, Paula Tenedório *(Portugal)*

P3.67 The management of uveitic glaucoma with PAUL® glaucoma implant
Filofteia Tacea, Neeru Vallabh, Kenneth Yau, Cecilia Fenerty, Fiona Spencer, Leon Au *(United Kingdom)*

P3.68 Feasibility, efficacy and safety of early lens extraction in patients with pseudoexfoliation glaucoma: a feasibility and pilot study
Sara Pose-Bazarra[1], Maria Jesus Lopez-Valladares[1], Ignacio López-de-Ullibarri[1], Augusto Azuara-Blanco[2] *([1] Spain, [2]United Kingdom)*

P3.69 Methods for treatment of secondary uncompensated glaucoma
Begimai Kasygulova, Tatiana Lubimova *(Russian Federation)*

P3.70 Changes in anterior segment parameters after phacoemulsification in patients with pseudoexfoliation glaucoma versus patients with primary open-angle glaucoma and normal subjects
Hatice Tekcan, Serhat Imamoglu, Süleyman Kugu *(Turkey)*

P3.71 Challenges in combined Ahmed valve and phacoemulsification with intraocular lens implantation in secondary glaucoma
Dorin Chiselita, Madalina Balha, Anca Pantalon *(Romania)*

P3.72 Glaucoma surgery in secondary uveitic glaucoma in children with juvenile idiopathic arthritis
Eva Skrla, Otakar Dušek, Petra Svozilkova, Jarmila Heissigerova, Marek Fichtl *(Czech Republic)*

P3.74 Combined Ahmed valve/gonioscopy-assisted transluminal trabeculotomy: a novel surgical technique for advanced open angle glaucoma
William Trask, Ammar Khan, Andrew Crichton *(Canada)*

P3.01
A genome-wide association study for a corticosteroid-induced increase in intraocular pressure after using topical corticosteroids

Ilona Liesenborghs[1,2], van Beek Daan[2], Adriaens Michiel[2], Tos Berendschot[1], Theo Gorgels[1], Iris Boesten[1,3], Michiel Cornelissen[1], Wishal Ramdas[4], Rudy Nuijts[1], Henny Beckers[1], Carroll Webers[1], Lars Eijssen[3], Jan Schouten[5]

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Purpose: An increased intraocular pressure is a common side effect of topical and systemic corticosteroids, also called a corticosteroid response, that may cause visual field loss and blindness. The treatment options are sparse and can hardly be based on the molecular pathogenesis which is still largely unknown. To investigate the molecular pathogenesis, we performed a genome-wide association study in patients with a corticosteroid-induced increase in intraocular pressure. This can increase the understanding of the pathogenesis and allows the identification of candidate genes for new treatment options.

Methods: Blood samples for genome-wide association analysis were collected from patients who had used long-term topical corticosteroids according to protocol. Corticosteroid responders were carefully defined to avoid misclassification. In addition, a distinction was made between high and low responders.

Results: A study cohort of 339 patients was included (39.5% corticosteroid responders of which 27.6% were high responders). Comparing responders vs. non-responders, revealed 172 SNPs and 18 genes. These genes were found to be involved in the expression of the glucocorticoid receptor, the development or functioning of the trabecular meshwork, or refer to molecular processes like the extracellular matrix and cell cycle. We also identified UBL5 which might determine whether a patient develops a corticosteroid-induced increase in IOP. Multiple of the identified genes are targeted by rho-kinase inhibitors.

Conclusion: For as far as we know, the current study is the largest cohort that investigated the pharmacogenomics of a corticosteroid-induced increase in IOP. Changes in the extracellular matrix and the cell cycle of the trabecular meshwork seem to be involved in the pathogenesis of a corticosteroid response. In addition, we identified genes that are involved in the expression of the glucocorticoid receptor and the development or functioning of the trabecular meshwork. We also found that small genetic variances in one of the identified genes (UBL5) might determine whether a patient develops a corticosteroid-induced increase in IOP or not. Furthermore, rho-kinase inhibitors warrant further investigation as treatment for a corticosteroid-induced increase in IOP, with potential target genes identified in both high and low responders.

P3.02
Ocular severe involvement in oculofaciocardiodental syndrome: description of a case series

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Purpose: Oculofaciocardiodental (OFCD) syndrome is a rare genetic disorder affecting ocular, facial, dental, and cardiac systems. Genetic analysis of OFCD syndrome revealed that it is caused by a mutation in the encoding BCL-6 interacting corepressor gene (BCOR). We report a case series of three patients with OFCD syndrome, and different BCOR mutations with severe glaucoma.

Methods: Description of the clinical and molecular findings in a series of three patients with OFCD syndrome with identified pathogenic BCOR variants, followed at the Department of Ophthalmology of CHUSJ, a tertiary center in Portugal. Clinical follow-up and examinations are presented, emphasizing ocular involvement.

Results: Three female patients present with different BCOR mutations: a seven years-old girl with a duplication (mutation 2037_2038dupCT), a nine years-old girl with a microdelection (Xp21.2-p11.4) in BCOR and a 25 years-old female with a deletion (c3858_3859del) in BCOR gene. Systemic involvement is variable among the patients varying from great general state without cardiac involvement to more severe disease with intra-auricular and intra-ventricular communications and pulmonary hypertension. All the patients presented with congenital cataracts diagnosed in the first days of life. Cataract surgery was performed without incidents between 6 and 8 weeks in all the patients. Postoperatively, the three patients developed ocular hypertension and glaucoma with need for surgical interventions, including trabeculectomy, Ahmed valve implementation and cyclophotocoagulation. Furthermore, low vision with nystagmus is a characteristic finding in all the patients.

Conclusion: Independently of the BCOR mutation, OFCD syndrome characterizes by a severe ocular involvement with glaucoma as a characteristic find. Ocular hypertension post cataract surgery in these patients is challenging, almost always needing surgery during childhood. The few cases of OFCD syndrome described in the literature also refer glaucoma as a complication of these patients during their lives. Therefore, we consider BCOR mutation predisposes to higher glaucoma incidence after congenital cataract surgery compared with other patients with congenital cataracts not associated with this syndrome. The awareness of this complication is crucial for an adequate follow-up of the patients.

P3.03
Genetics of congenital glaucoma in 31 Bulgarian patients

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[1]Alexandrovska Unversity Hospital, Sofia, Bulgaria, [2]Molecular Medicine Center MU - Sofia, Sofia, Bulgaria

Purpose: Our work aimed to analyse gene mutations in patients with primary congenital glaucoma in Alexandrovska university hospital diagnosed from 2007 to 2020.

Methods: 31 patients with a diagnosis of congenital glaucoma (21 Gypsy PCG patients and 10 caucausian patients) were examined by next-generation sequencing with MiSeq/Illumina apparatus (TrueSight one kit, including 4813 target genes) and Sanger sequencing and diagnosed with PCG. Age of onset was 0-3 years, but genetic testing was performed in patients ranging 0-17. Blood samples were taken from affected subjects and their relatives after informed consent according to the Declaration of Helsinki. DNA was extracted from peripheral blood lymphocytes according to a previously reported method. 31 DNA samples were subjected to NGS and Sanger sequencing.

Results: Our results support previous studies reporting that the CYP1B1 gene is a major gene for primary congenital glaucoma. A different pattern of CYPB1 mutations exists in Gypsy patients and Caucasian patients. Findings confirm CYP1B1 (E229K, R368H, E387K, R390C and F445I) mutation predominance, especially in Roma people. Among the Caucasians two were diagnosed with Cyp1B1 mutations, two were diagnosed with Axenfeld rieger (PITX2) and in the others no genetic mutation was found.

Conclusion: From our small sample of PCG individuals' cases we can conclude that the majority of PCG cases are Roma patients in wich mutations are found to be in CYP1B1. In contrast comparing to Caucasians are less likely to carry a CYP1B1 mutation. It is important to note that our Roma patients come from populations with high consanguinity rates and/or founder effect.

P3.04
Axenfeld-Rieger syndrome associated glaucoma

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Purpose: To describe a clinical case of Axenfeld-Rieger syndrome associated glaucoma. The patient was diagnosed and routinely followed up in the Pediatric Eye Unit, Eye Clinic, University Hospital "Alexandrovska".

Methods: Observational case report of a patient with glaucoma associated with Axenfeld-Rieger syndrome. The data was collected using the medical records and was performed a complete ophthalmologic exam.

Results: We identified one patient- a 9-year old boy, with genetically confirmed Axenfeld- Rieger syndrome. His mother shows typical for the syndrome features, but in her case the diagnosis is not confirmed with a genetic test. Besides the ophthalmic symptoms resulting from the anterior segment dysgenesis, the boy also has distinctive for the Axenfeld- Rieger syndrome facial dysmorphism, dental anomalies, hydronephrosis and developmental delay. The child has developed secondary glaucoma early in life and has bilateral buphthalmos. However he has high hyperopia which is unusual, considering the enlarged eyeballs and the expected occurrence of myopia. He has been treated conservatively with intraocular pressure- lowering topical drugs since very young age. Despite the therapy, his OCT scans show thinning in the retinal nerve fiber layer which is consistent with glaucoma.

Conclusion: Glaucoma is the main cause of visual morbidity in patients with Axenfeld-Rieger syndrome, therefore a complete periodic ophthalmological exam and optimization of the anti-glaucoma therapy are a priority. Genetic consulting and testing are crucial for making the right diagnosis as well as for identifying additional genetically driven pathology.

P3.05
MYOC gene mutation associated POAG: a study in two families of Czech origin

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Purpose: Characterizing genotype and phenotype in two families of Czech origin harbouring two different pathogenic variants of MYOC gene.

Methods: 10 family members of two unrelated families with an autosomal dominant pattern of inheritance for primary open angle glaucoma (POAG) underwent complex ophthalmological examination. Direct sequencing targeted at the three most frequent mutations was performed in both probands from the two families, in family 2 proband exome sequencing was subsequently performed. Others family members were tested for mutation using direct sequencing.

Results: 8 out of the 10 tested individuals (average age 32,2 ± 10,9 years) had severe glaucomatous neuropathy. The average intraocular pressure (IOP) at the time of examination was 21,63 mmHg (SD ± 7,71 mmHg) in Family 1 and 26,7 mmHg (SD ± 11,7 mmHg) in Family 2 members. At time of IOP measurement all family 1 patients and 66 % of family 2 patients were on at least three IOP lowering drugs. The maximum IOP measured was 37 mmHg in family 1 and 55 in family 2. 80% of patients achieved IOP stabilization only after filtration surgery, which was performed in the range of 1 to 7 years from diagnosis, with most of the surgery being performed up to 2 years from diagnosis. Cyclodestructive surgery was additionally performed in one female patient (family 2). Genotype analysis identified MYOC gene variant c.1099G>A; p. (Gly367Arg) in family 1 affected members while variant c. 1440C>A p. (Asn480Lys) was identified in family 2 affected members. Both variants were evaluated as pathogenic.

Conclusion: Our study is the first work describing genotype and phenotype characteristics of MYOC gene mutations in the Czech population. Genetic testing in POAG patients should be considered in individuals with early onset of POAG manifestations and a positive family history since several MYOC pathogenic variants confer more than 50% lifetime risk of developing POAG. The course of MYOC mutations associated POAG is often more severe and requires early surgery to achieve stabilization of IOP.

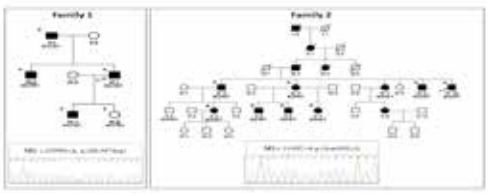

Figure 1: Family tree of the two families. Subjects examined at our clinic are marked with an asterisk.

P3.06
Retrospective analysis of telematic glaucoma clinic as a consequence of COVID-19 pandemic

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Purpose: Due to COVID-19 pandemic, the glaucoma clinic had to adapt in order to meet the needs of this chronic disease. New technologies, structural and functional tests allowed us to telematically monitor some of these patients.

Methods: We carried out a retrospective analysis of patients with open angle glaucoma visited since September 2021, 1 year and a half after the pandemic beginning, comparing VF and OCT parameters depending on whether they had telematic or only face-to-face controls. In the telematic clinic, VA (Visual Acuity) was performed with Snellen chart, VF (Visual Field) with Humphrey, OCT (optical coherence tomography) with CIRRUS 5000 and IOP (Intraocular Pressure) measurement with CORVIS ST. In face-to face clinic Goldman tonometer was used.

Results: A total of 204 eyes from 118 patients were included in the analysis, 104 in the group with some telematic control (group 1) and 100 with in only face-to-face controls (group 2). The mean age of group 1 was lower than group 2 (69.4 versus 73.5 years). In group 1, an average of 3.37 face-to-face visits and 1.27 telematic visits were made, versus group 2, which were made an average of 4.4 face-to-face visits. There was no significant difference between the pre-pandemic visits and the visits 2 years after it, neither in VA, IOP, average thickness of peripapillary fiber layer nor ganglion cells measured by OCT, nor visual field parameters (VF and MD).

Conclusion: Telematic management of the glaucoma clinic, if we have appropriate tools, can be useful to maintain the quality of care in periods of saturation of face-to-face consultations or times in which face-to-face control is completely impossible. Longer-term studies with a greater number of patients are necessary to determine if the progression of glaucoma can be altered depending on the patient's control.

P3.07
Remote glaucoma patients postoperative follow-up using mobile gadgets

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Purpose: We aimed to assess the possibility of a mobile phone and messenger using in postoperative follow-up of patients after trabeculoectomy.

Methods: During COVID-19-related restrictions of office visits we analyzed 15 cases of remote follow-up in patients undergone trabeculectomy with shooting of the filtation bleb using mobile phone camera at close range and followed sending the photos to the doctor using a messenger. 10 patients were intstructed by phone and took pictures by themselves or with their relative's help. In 5 cases the photo was taken by an local ophthalmologist using mobile phone and slit lamp.

Results: The case series discovered that mobile camera using allows to assess signs of scarring as the filtration bleb limited area and hyperemia in all cases. The slit lamp photos were taken by ophthalmologists in close distance and had high quality in 4 cases. On the other hand, patients made more distant shooting with high quality less than in 50% of pictures.

Conclusion: Postoperative follow-up in glaucoma can be provided remotely using a mobile phone and messenger. The mobile photos allows bleb appearance assessment to change medications and establishing term of bleb needling.

P3.08
Optic nerve head changes measured with optical coherence tomography angiography in COVID-19 patients one year after infection

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Purpose: The aim of this work was to identify retinal and optic nerve changes in patients admitted to intensive care unit with COVID-19, one year after of infection

Methods: We analysed 17 patients COVID-19 positives and 22 healthy controls, one year after disease presentation. Patients with systemic vascular diseases or previous retinal or optic nerve pathology were excluded. Optical coherence tomography (OCT) and OCT angiography (OCT-A) images from external retina and optic nerve head (ONH) were taken using a Heildelberg Spectralis, version 1.10.4.0. Central foveal thickness was defined as the distance between external limiting membrane and the inner border of the retinal pigment epithelium (RPE). Subfoveal choroidal thickness was measured from RPE to sclerochoroidal interface.ONH peripapilary capillary plexus,known as Radial Peripapillary Capillary Plexus (RPCP), was analysed using grid schematized at image Nº 1 with OCT-A. A non-parametric analysis was performed with the t-test.

Results: Regard structural and angiographic posterior pole variables analyzed. Decrease values were found in COVID-19 group patients, statistically significant differences in central foveal thickness (p = 0.000) and subfoveal choroidal thickness (p = 0.002). No significant difference was observed in nerve fiber layer thickness and vascularization

Conclusion: Previous studies have described alterations in

thickness of retinal layers attributed to virus, during first 6 months of moderate to severe infection, as well as decrease RPCP perfusion density, especially in patients with arterial hypertension, one month after disease. The fact that there is a persistent decrease in retinal thickness tells us that the virus was most likely present in ocular tissues and they were recovering and could continue to do so, therefore nerve fiber layer has returned to normal values. Additionally, our patients did not present any vascular pathology, which makes it less likely that these alterations are due to other causes.

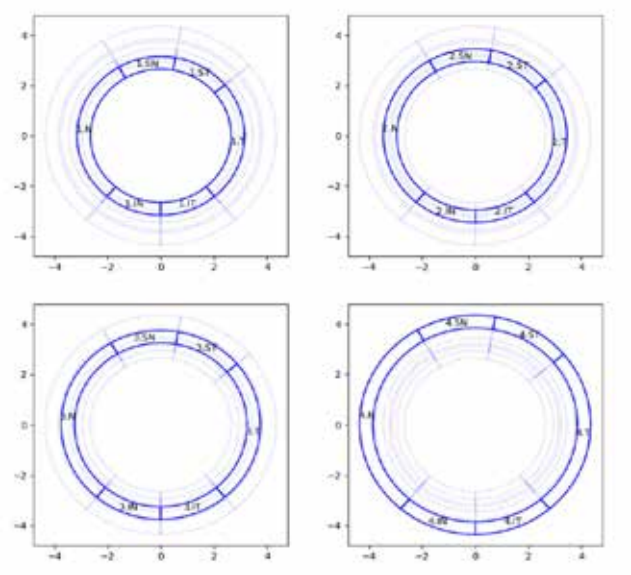

Figure 1. 6.5.5 ONH-OCTA grid. The ONH-OCTA grid is broken up into 4 rings, each divided into 6 Garway-Health sectors. The sector sizes are: 40° for the superior and inferior sector, 90° for the temporal sector, and 110° for the nasal sector. The mean diameters of the rings are 2.9 mm, 3.2 mm, 3.5 mm, and 4.1 mm. Each ring has a width of 0.5 mm.

P3.09
Effect of the COVID-19 pandemic on progression to glaucoma surgery in patients followed up in a retina unit

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Purpose: In this study, we aimed to investigate the effect of the COVID-19 on progression to glaucoma surgery in patients followed up at the retina unit of the Ophthalmology Outpatient Clinic of Health Sciences University Antalya Training and Research Hospital.

Methods: The patients who were followed up at the retina unit of our hospital. The patients were divided into four groups. The patients who presented to the retina unit and underwent glaucoma surgery were evaluated in four periods as Group 1, March 11, 2019-September 11, 2019; Group 2, September 12, 2019-March 11, 2020; Group 3, March 12, 2020-September 11, 2020; and Group 4, September 12, 2020-March 11, 2021, and patient ratios were compared between these periods.This study was retrospective.

Results: The ratio of the number of patients who underwent glaucoma surgery to the number of those presenting to the retina unit was found to be statistically significantly increased in Group 4 compared to the remaining three groups ($p < 0.0001$ for all). The ratio of the number of patients who were followed up in the retina unit and underwent surgery due to neovascular or silicone oil-induced glaucoma to the total number of patients who presented to the retina unit was statistically significantly increased in Group 4 compared to Groups 1 and 2 ($p = 0.001$ for both).

Conclusion: This study is the first to examine the effect of the COVID-19 pandemic on progression to glaucoma surgery in patients followed up at the retina unit. We found an increase in the number of patients that required surgery for neovascular or silicone oil-induced glaucoma compared to previous years as a result of not attending regular follow-up at the retina unit due to COVID-19. We consider that inability to apply timely treatments due to the pandemic conditions are effective in this situation.

P3.10
Peripheral laser iridoplasty in chronic narrow-angle glaucoma: anatomical results examined by sd anterior segment OCT

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Purpose: To evaluate the anatomical and functional efficacy of peripheral laser iridoplasty in eyes with narrow iridocorneal angle.

Methods: 24 eyes of 14 patients with narrow-angle not responsive to iridotomy Nd:YAG laser. All patients underwent 360° peripheral iridoplasty laser. Patients were examined at T0 before the procedure, at T1, 20 minutes after, at T2 one week after. The amplitude of the iridocorneal angle in the temporal and nasal sector were evaluated.

Results: Mean distance from the Schwalbe line in the temporal sector at T0 was 215 microns, at T1 339 microns and at T2 319 microns. In the nasal sector was at T0 189 microns, T1 338 microns and T2 319 microns. At 500 microns the distance between trabecular surface and iris anterior surface was in the temporal sector at T0 of 125 microns, at T1 of 205 microns and at T2 of 185 microns. In the nasal sector it was T0 92 microns, T1 231 microns and T2 194 microns respectively. $p < 0.0001$ both between T0 and T1, and between T0 and T2 both between the nasal sector at the level of the Schwalbe line and at a distance of 500 microns from the scleral spur.

Conclusion: Peripheral laser iridoplasty is a rapid procedure, well tolerated by the patient, able to solve angular closures not responsive to Nd:YAG laser iridotomy.

P3.11
Difference in safety profile and intraocular pressure (IOP) changes during Ziemer LDV Z8 femtosecond laser pretreatment of cataract between eyes with primary angle closure disease and normal eyes

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Purpose: Hypothesis: Intraocular pressure (IOP) in primary angle closure disease (PACD) patients increases more than those

without glaucoma during femtosecond laser pre-treatment of cataract but that there will be no long term sequelae (i.e.optic nerve head damage). Specific objectives: Quantify and compare changes in IOP during Ziemer-LDV- Z8 FLACS pre-treatment of cataract between the two groups

Methods: Clinically stable PACD patients post laser peripheral iridotomies and normal patients underwent FLACS. Pre-treatment was performed using a fluid-filled optical docking system (Ziemer-LDV-Z8). IOP was measured at 3-time points using an applanation tonometer: prior to administration of suction, with the platform suction on and 1-minute after laser pre-treatment. Optical coherence tomography and Humphrey visual fields were also performed pre and post-operatively at specified time points

Results: There were 38 eyes and 40.5% had PACD. The mean baseline IOP was 18.6 mmHg ± 2.0 in PACD and 17.1 ± 3.1 mmHg in normal eyes (p = 0.08) (11 to 21 mmHg). In PACD, the mean IOP before, during and after suction was 21.1 ± 5.3 mmHg (12 to 37 mmHg), 79.1 ± 14.9 mmHg (42 to 89 mmHg) and 18.5 ± 5.9 mmHg (8-33 mmHg) respectively. In normal eyes, the mean IOP before, during and after suction was 19.1 ± 1.9 mmHg (17-21 mmHg), 70.0 ± 13.8 mmHg (45-86 mmHg) and 16.6 ± 4.4 mmHg (10-21 mmHg) respectively. Between the 2 groups, the mean difference in IOP before and during suction was 5.0 ± 3.9 mmHg (p < 0.01). The mean difference between IOP during and after suction was -3.7 ± 1.9 mmHg (p < 0.01). The mean suction duration was 203 ± 16 seconds (range 175-235 seconds). The HVF for PACD patients preoperatively had a mean MD of -5.6 ± 4.5 and mean PSD of 2.5 ± 1.2. 6 months post operatively, the mean MD was -2.5 ± 2.5 and mean PSD of 3.0 ± 3.2 (p = 0.4)

Conclusion: Femtosecond pre-treatment caused a slightly greater transient rise in IOP in PACD eyes compared to normal eyes during and after vacuum application. This was well tolerated short term with functional tests showing no significant damage however, long-term implications for angle closure eyes are still unknown. Also, it was noted that the HVF MD often improved, this was likely due to the removal of the hazy media

P3.12
Surgical management of primary angle-closure glaucoma

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Purpose: To demonstrate the efficacy and surgical results of pupilloplasty combined with phacoemulsification and endocyclophotocoagulation (ECP) in cases of angle-closure glaucoma (ACG).

Methods: Nine eyes of nine patients were included in this case series. The study is characterized by being prospective, descriptive and consecutive. ACG patients underwent phacoemulsification, ECP, and pupilloplasty. The best corrected visual acuity (BCVA), measured in logarithm of the minimum angle of resolution (logMAR), the evaluation of intraocular pressure (IOP), as well as the number of drugs, were valued. In all cases, indentation gonioscopy and angle analysis were performed; in addition to anterior segment optical coherence tomography to assess the anterior chamber angle (AS-OCT).

Results: Of the nine cases with ACG, the opening of the angles of the anterior chamber with rupture of the peripheral anterior synechiae (PAS) was demonstrated. The mean preoperative and postoperative BCVA was 0.9 ± 0.4 and 0.2 ± 0.1 LogMar, respectively. Mean preoperative and postoperative IOP was 28.2 ± 8.9 and 10.7 ± 0.9 mmHg, respectively. The PAS grades and the mean preoperative and postoperative PAS area were 241.1 ± 116.6 and 3.3 ± 6.6, and 5.7 ± 6.2 and 0.4 ± 0.8. The degree of angle closure with a preoperative and postoperative mean of 175.0 ± 156.6 and 5.0 ± 15.0. The number of drugs was evaluated, finding a postoperative reduction.

Conclusion: Surgical pupilloplasty combined with phacoemulsification and ECP helps to open the appositional closure and contribute to PAS rupture. Lens extraction with the combination of these procedures can effectively reduce IOP and thus increase the outflow of aqueous humor by lowering intraocular pressure.

P3.13
Laser iridotomy versus combined phacoemulsification and viscogonioplasy in treatment naïve primary angle closure patients: results from a tertiary centre in the UK

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Purpose: To compare the outcomes of laser peripheral iridotomy (LPI) and phacoemulsification combined with viscogonioplasty (phaco-VGP) on a cohort of treatment naïve patients with primary angle closure (PAC)

Methods: Retrospective, observational study. Subjects involved were patients newly diagnosed with PAC between 2015 and 209, with no evidence of glaucoma and no previous treatment (i.e., no previous eye surgery nor, laser eye surgery), who have been offered either LPI or phaco-VGP as a treatment option. Terminology provided by The College of Optometrists has been used to define PAC. Exclusion criteria comprises any other eye comorbidity, poor or insufficient clinical data. Postoperative follow ups occurred at 2 weeks, 3 months, 6 months, 12 months and 24 months. Primary outcomes measured were intraocular pressure (IOP) reduction and number of anti-glaucoma agents. Secondary outcomes consisted of best corrected visual acuity (BCVA), mean deviation (MD) on Humphrey Field Analyser and postoperative complications

Results: Fifty-six and 109 eyes underwent phaco-VGP and LPI respectively during the given time period. The IOP reduction observed across the follow up period was 23.04% and 6.29% in the phaco-VGP and LPI respectively. The BCVA improved from 67.29 ± 12.11 letters to 77.93 ± 7.20 letters in the phaco-VGP group, and varied from 79.16 ± 8.53 letters to 79.87 ± 8.67 in the LPI group. The MD variation observed was -6.28 dB to +0.51 dB in the phaco-VGP group and -4.7 dB to 2.65 dB in the LPI group. In the phaco-VGP group the number of anti-glaucoma agents reduced from 1.6 ± 0.2 to 0.5 ± 0.1. In the LPI group the number of anti-glaucoma agents decreased from 1.2 ± 0.1 to 1.1 ± 0.1. Postoperative uveitis was the most common complication in the phaco-VGP group (19.6%); no posterior capsule rupture was observed. In the LPI group, IOP spike was the most frequent complication, occurred in 18.35 % of cases.

Conclusion: Phaco-VGP provided a significantly better outcome in terms of BCVA, IOP, number of anti-glaucoma agents and MD compared to LPI at two years. Despite LPI carries an overall greater safety profile, no serious adverse events were registered in either groups.

P3.14
Results after treatment with MicroShunt PreserFlo® of refractory to medical treatment congenital glaucoma in a patient with mycosis fungoides included in clinical trial ASTX660

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Purpose: To describe new surgical treatment options for congenital glaucoma refractory to trabeculectomy associated with medical treatment. The microshunt is an alternative to filtering surgery failure which offers a good safety profile and moderate pressure decrease.

Methods: A 44-year-old male with history of mycosis fungoides and congenital glaucoma had undergone bilateral trabeculectomy and was being treated with Timoftol ®. He attended consultation due to ocular hypertension (OHT) secondary to treatment with high-dose oral corticosteroids for bilateral peripheral facial paralysis after inclusion in the ASTX660 onco-derma-hematology clinical trial.

Results: Initially, intraocular pressure (IOP) was 48 mmHg in the right eye (RE) and 19 mmHg in the left eye (LE). Treatment prescribed was mannitol 20% IV, furosemide, acetazolamide 250mg/8h, Combigan® /12h and Lumigan® /12h, reaching an IOP OD of 30 mmHg 2 hours later. The following 3 months, treatment was started successively with Combigan®, Duokopt®, Ganfort® and Taptiqom® without achieving optimal IOP control and with poor tolerance, so combined cataract surgery and microshunt. with mithymicin C (MMC) was performed. At one month, IOP OD was 4 mmHg, and at 2 months 20 mmHg without treatment. A bleb revision was performed with MMC and collagen matrix, and an 8 mmHg IOP without treatment was achieved. One month later, the bleb presented a cystic appearance and IOP OD was 14 mmHg with Timolol ®. A bleb revision with release of adhesions and perilesional dexamethasone was done again, reaching an IOP 2 months after surgery of 12 mmHg without treatment.

Conclusion: Minimally penetrating surgeries represent a new therapeutic step in the surgical treatment of glaucoma. In refractory cases to medical therapy, the microshunt can achieve an adequate intraocular pressure control with a good safety profile, resorting to more invasive surgeries in the future.

P3.15
Evaluation of risk factors for failure in primary congenital glaucoma patients with 360 degree Ab externo suture trabeculotomy

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Purpose: Our aim in this study was to analyze the risk factors for failure in Primary congenital glaucoma (PCG) patients who had a history of 360 degree ab externo suture trabeculotomy

Methods: In this retrospective study, we include the patients with the diagnosis of PCG. The eyes of the patients were analyzed only if their schlemm canal were successfully 360 degree cannulated.Demografic features, clinical exam results and risk factors for surgical failure such as absence of anterior chamber hemmorhage peroperatively after suture trabeculotomy and/or presence of severe corneal haze were evaluated. Success criteria were defined as intraocular pressure (IOP) ≤ 21 mmHg without medication (complete success) and with medication (partial success).

Results: Nineteen eyes of 13 patients (Male/Female: 8/5) who underwent 360 degree ab externo suture trabeculotomy were retrospectively reviewed. Median age of diagnosis was 9 months. Median preoperativr IOP was 29 mmHg with a median number of 2 antiglaucomatous drops. Median postoperative IOP was 8 mmHg with a median number of 0 antiglaucomatous drops.The difference was statistically significant ($p < 0.001$). In one eye anterior chamber hemorrhage was not observed after suture trabeculotomy, also 4 eyes had severe corneal haze. These five eyes showed surgical failure (26.3 %). Overall success rate was 73.7 %.

Conclusion: 360 degree external suture trabeculotomy is a successful treatment in PCG patients. Even if 360 degree trabeculotomy successfully completed, the absence of anterior chamber hemorrhage or presence of severe corneal haze in PCG patients were observed to be risk factors for surgical failure.

P3.16
Challenges in artificial drainage system implantation in pediatric advanced secondary glaucoma

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Purpose: Is to present the clinical case and surgical challenges of an Ahmed glaucoma valve implantation in a child with significant history for multiple intraocular surgeries mandated by previous ocular penetrant (corneal laceration at the age of two, traumatic cataract extraction with scleral sutured PC-IOL, retinal detachment repair, secondary siliconic glaucoma with failed augmented trabeculectomy, scleral melting and intercalary staphyloma in the superior quadrant).

Method: Teenage girl, aged 16, addressed our clinic for uncontrolled secondary glaucoma in OS. BCVA = hand movement, IOP OS = 45 mmHg under maximal medication, C/D ratio = 1. For avoiding hypotonia after implanting a GDD in a vitrectomized eye with long axial lengths (26.80mm) and for obtaining a rapid decrease in IOP, we opted for an Ahmed glaucoma valve (FP8). Endothelial cell count revealed reasonable number in OS 1804/mm^2. Fellow eye was within normal limits.

Results: IOP control after the surgery was good (IOP OS = 9 mmHg), with unobstructed tube placed in the sulcus and well fixated plate at the sclera. In the hypertensive phase of the AGV the IOP raised until 30 mmHg at 4 weeks post-op; at week 6 an IOP of 40 mmHg mandated 2 successive needling maneuvers with additional use of 5FU which achieved good IOP control (17 mmHg) at month 5 post-op with topical medication (Cosopt, bid).

Conclusion: Despite a successful surgery and good IOP control, the results needs to be monitored long term, especially related to the long life expectancy of the patient and the complications that might appear in this multiple operated eye in a young patient.

P3.17
Long term outcomes of primary deep sclerectomy in primary congenital glaucoma

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Purpose: To report the long-term safety and efficacy of penetrating and nonpenetrating deep sclerectomy as a primary procedure in primary congenital glaucoma.

Methods: A retrospective chart review of 72 eyes of 43 patients diagnosed with primary congenital glaucoma from birth to 1 year of age and underwent deep sclerectomy with mitomycin-C as a primary procedure. Pre- and postintervention glaucoma indices were assessed. Complete success rate was identified as achieving an end-point of intraocular pressure < 21 without any antiglaucoma medications. Data were analyzed to compare pre- and postintervention changes and to compare both procedures.

Results: Nonpenetrating deep sclerectomy (NPDS) and penetrating deep sclerectomy (PDS) underwent in 51 and 21 eyes, respectively. The mean follow up were 6.8 year for NPDS and 7.18 years for PDS. In NPDS cases, the intraocular pressure (IOP) was significantly decreased from 26.2 ± 6 mmHg preoperatively to 18.4 ± 4.7 mmHg at the last follow-up visit (P = 0.004). While in PDS cases, the intraocular pressure (IOP) was significantly decreased from 27.1 ± 4.3 mmHg preoperatively to 15.7 ± 2.1 mmHg at the last follow-up visit (P = 0.005). For the NPDS cases, the complete success rate was 47.1%, whereas the overall success rate was 66.7% at last follow up. For the PDS cases, the complete success rate was 47.6%, whereas the overall success rate was 76.2% at last follow up. Kaplan-Meier survival curves showed that success rates for NPDS cases at 1, 2, 3, 4 and 5 years after surgery were 86 %, 79%, 77 %, 77%, and 75%, respectively. For PDS cases, the success rate was 90% at 1 year and 85% at 2,3,4 and 5 years after the surgery. However, this difference was not statistically significant (p = 0.394). Neither serious intra-operative nor postoperative complications were observed in both groups.

Conclusion: Deep sclerectomy (nonpenetrating and penetrating) is a long term effective and safe option as a primary procedure for primary congenital glaucoma.

P3.18
Effectiveness and safety of the gel stent versus trabeculectomy in patients with primary open angle glaucoma: a 12-month randomized, multicenter study

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Purpose: To compare the effectiveness and safety of XEN-45 (gel stent) to trabeculectomy (trab) in patients with primary open-angle glaucoma (POAG) poorly controlled by topical intraocular pressure (IOP) -lowering therapy.

Methods: One eye per patient from the Gold Standard Pathway Study (GPS) was randomized. Results for POAG patients are summarized. Primary endpoint: patients (%) achieving ≥20% IOP reduction from baseline (BL) at Month 12 (M12) without medication increase, clinical hypotony, vision loss to counting fingers or secondary surgical intervention (SSI). Secondary endpoints (M12): mean IOP and medication count vs BL, changes in mean IOP and medication count from BL; needling rate; interventions; mean changes in best corrected visual acutiy (BCVA); intra- and postoperative complications; Symptom and Health Problem Checklist (SHPC-18) questionnaire.

Results: Of 158 eyes enrolled, 141 had POAG and 130 were treated (gel stent, 88; trab, 42); 61% and 69% met the primary endpoint at M12 (p = 0.394). Mean (SD) IOP decreased from 22.9 (5.8) mmHg on 2.5 (1.0) medications at baseline to 14.5 (4.2) mmHg on 0.6 (1.0) medications at M12 (gel stent), and from 22.4 (5.8) mmHg on 2.2 (1.0) medications to 11.9 (3.6) mmHg on 0.3 (0.5) medications (trab) with significant mean change from baseline (p < 0.001). Rates of needling, interventions, and intraoperative complication: 22.74%, 40% and 2% (gel stent) vs 19%, 76% and 7% (trab). Mean change in BCVA with glasses (gel stent/trab): -1.4 (2.0) /-2.5 (2.9) (day 1); -1.2 (1.9) / -2.2 (3.2) (week 1); 0.0 (1.2) /0.07 (0.9) at M12 (Manifest Refraction). Ocular adverse events (AE; gel stent/trab): 71.6%/90.5% of participants; hypotony (IOP ≤ 6 mmHg at two consecutive visits) being the most common AE reported - 14.8% (gel stent) and 28.6% (trab). SHPC-18 demonstrated greater improvement in both domains with the gel stent.

Conclusion: The proportion of eyes achieving the primary endpoint was numerically lower with the gel stent than trab, however this difference was not statistically significant. A significant decrease in IOP and glaucoma medications was observed, with a lower mean in the trab group. However, the gel stent required fewer interventions, had less change in early and long term BCVA, and better patient-reported outcomes.

P3.19
Surgical outcome comparison between initial trabeculectomy and Ex-PRESS in terms of achieving an intraocular pressure of < 15 and 18 mmHg: a retrospective single center comparative study

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Purpose: To evaluate the postoperative outcomes of initial trabeculectomy and Ex-PRESS in terms of achieving an intraocular pressure (IOP) of < 15 or < 18 mmHg.

Methods: This study retrospectively analyzed 64 and 54 cases of trabeculectomy (Trab) and Ex-PRESS (EX) performed by the same surgeon with uniform management from April 2018 to March 2019, respectively. Surgical success was defined as 5 < IOP < 15 mmHg (criterion 1) and 5 < IOP < 18 mmHg (criterion 2) without additional glaucoma medication, needling, and bleb reconstruction 2 months after surgery.

Results: The Trab/EX groups had an IOP of 22.6 ± 6.2 mmHg /21.8 ± 6.0 mmHg before surgery (p = 0.507), 12.6 ± 2.6/14.0 ± 4.4 (p = 0.06) at 6 months, 12.7 ± 2.3/12.9 ± 2.8 (p = 0.678) at 12 months, 13.3 ± 2.6/12.6 ± 2.8 (p = 0.260) at 18 months,

and 13.2 ± 2.3/13.6 ± 2.8 mmHg (p = 0.444) at 24 months, respectively. The proportion of those with an IOP < 15 mmHg in the Trab/EX groups was 82%/81% at 6 months, 68%/62% at 12 months, 63%/61% at 18 months, and 57%/53% at 24 months, respectively. The log-rank test showed no significant difference between the groups for criteria 1 (p = 0.755) and 2 (p = 0.138). Multivariate logistic analysis identified only preoperative higher IOP as a risk factor for surgical failure (odds ratio for criteria 1: 1.076, p = 0.009 and criteria 2: 1.068, p = 0.048).

Conclusion: Postoperative outcomes of Trab and EX suggested similar ability for achieving an IOP below 15 and 18 mmHg without medication and interventions.

P3.20
Eight-year outcomes of two first-generation trabecular micro-bypass stents (iStent) with phacoemulsification in primary open-angle glaucoma

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Purpose: The short- and medium-term outcomes of trabecular micro-bypass stents have been extensively studied; however, only a few studies have investigated their long-term outcomes. This study aimed to assess the long-term efficacy and safety of two first-generation trabecular micro-bypass stents (iStent) with concomitant cataract surgery in glaucomatous eyes while also evaluating measures of disease stability using visual field and optical coherence tomography (OCT) of the optic nerve and the macula throughout 8 years of follow-up.

Methods: This longitudinal, single-center consecutive case series included glaucomatous eyes that underwent implantation of two first-generation trabecular micro-bypass stents (iStent) with concomitant cataract surgery. Eight-year efficacy outcomes included mean intraocular pressure (IOP) and medications, as well as surgical success. Eight-year safety outcomes included best-corrected visual acuity (BCVA), visual field mean deviation (VF-MD), cup-to-disc ratio (CDR), retinal nerve fiber layer (RNFL) thickness, ganglion cell-inner plexiform layer (GC-IPL) thickness, and adverse events.

Results: A total of 62 eyes with primary open-angle glaucoma (POAG) were included. At 8 years postoperative, IOP reduced by 26% from 19.2 ± 3.9 mmHg preoperatively to 14.2 ± 2.4 mmHg ($p < 0.001$), 91.1% of eyes achieved IOP ≤ 18 mmHg (vs. 51.6% preoperatively), 69.6% of eyes achieved IOP ≤ 15 mmHg (vs. 14.5% preoperatively), and 25% of eyes achieved IOP ≤ 12 mmHg (vs. 1.6% preoperatively). Medication use decreased by 17.9% from 2.8 ± 1.1 preoperatively to 2.3 ± 1.2 (p = 0.018). Surgical success was 90%, as six eyes underwent subsequent glaucoma surgeries. Safety measures of BCVA, CDR, RNFL thickness and GC-IPL thickness remained stable through 8 years postoperative. VF-MD remained stable until postoperative year 5 and subsequently progressed according to the natural history of glaucomatous disease.

Conclusion: Implantation of two first-generation trabecular micro-bypass stents (iStent) with concomitant cataract surgery is an effective and safe treatment option for surgery-naïve POAG eyes, evidenced by significant IOP and medication reductions, reasonable surgical success, and favorable safety outcomes, throughout the 8-year follow-up. Our data additionally supports the efficacy of this combined procedure in stabilizing or slowing disease progression.

P3.21
The LiGHT trial 6-year follow-up results

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Purpose: The LiGHT trial found selective laser trabeculoplasty (SLT) to be clinically- and cost-effective as a primary treatment of open-angle glaucoma (OAG) and ocular hypertension (OHT) at 3 years: 78% of SLT-treated eyes met pre-set intra-ocular pressure (IOP) targets without medication. We report 6 years follow-up data on health-related quality of life, and clinical and cost-effectiveness.

Methods: This multicentre randomised controlled trial (ISRCTN32038223) compared initial treatment with SLT to initial treatment with IOP lowering medication, in newly-diagnosed treatment-naïve patients with OAG or OHT. Eye-specific target IOP and monitoring intervals were based on the Canadian Target IOP Workshop, according to disease severity (mean deviation and Hodapp criteria). During the 3-year extension, patients in the SLT arm were permitted a 3rd SLT, if necessary, and patients in the drops arm were allowed SLT as a treatment switch or escalation. We present here the intention to treat analysis.

Results: Of 692 patients completing 3 years in the LiGHT trial, 633 (91.5%) entered the extension and 524 patients completed the trial (82.8% of those entering the extension phase). At 6 years, there was little difference in health-related quality of life for EQ-5D, GUI and GQL-15 (all $p > 0.05$). 70.7% of eyes in the SLT arm remained at or below target IOP without the need for medical or surgical treatment. Eyes in both groups were within target IOP at a similar proportion of visits (92.8 vs 93.2%, for SLT-first and drop-first arms, respectively); more eyes in the drops arm exhibited disease progression (26.8% vs 19.7%, respectively). Trabeculectomy was required in 31 eyes in the drops arm compared to 13 eyes in the SLT arm. There were no serious laser-related adverse events.

Conclusion: SLT is a safe treatment for glaucoma and OHT, providing greater long-term disease control with less progression and reduced need for incisional glaucoma surgery than with initial IOP-lowering medication over 6 years. SLT should be considered a 1st-line treatment for glaucoma and OHT.

This abstract has been submitted for presentation at the 2022 American Glaucoma Society Meeting.

P3.23
Corneal endothelial cell loss after phacoemulsification and YAG-laser activation of trabecula in primary open-angle glaucoma and co-existing cataract

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Purpose: To compare postoperative central corneal endothelial cell density (ECD) loss and IOP after phacoemulsification alone and phacoemulsification with YAG-laser activation of trabecula (YAG-LAT) in eyes with primary open-angle glaucoma (POAG) and co-existing cataract.

Methods: The study included 70 patients (70 eyes) with early and moderate POAG and co-existing cataract. The follow-up period is 24 months. The patients were divided into two groups: the main group (36 eyes) that underwent YAG-LAT and phacoemulsification and the control group (34 eyes) that underwent phacoemulsification alone. Both the groups were age and sex matched. The baseline IOP in the main and control groups was 20.95 ± 2.98 mmHg and 20.50 ± 3.01 mmHg respectively. The mean medication use was 1.53 ± 0.0.65 in the main group and 1.44 ± 0.50 in the control group. Before treatment central corneal endothelial cell density was 2389 ± 79 cells/mm2 and 2394 ± 98 cells/mm2 in the main and control groups respectively. BCVA after treatment in both groups of patients was 0.95 ± 0.09 in the main group and 0.91 ± 0.12 in the control group.

Results: There were no intra- and postoperative complications. At the end of the period (24 months), the mean IOP was 15.21 ± 1.45 mmHg in the main group, and 17.52 ± 1.83 mmHg in the control group. The mean medication use in the main group decreased from 1.53 ± 0.65 to 0.64 ± 0.56 ($p < 0.001$), whereas in the control group it increased from 1.44 ± 0.50 to 1.92 ± 0.28 ($p < 0.001$). In both groups of patients, there were no statistically significant differences in the loss of corneal endothelial cells at different follow-up periods after surgery. Thus, after combined treatment and phacoemulsification alone the central ECD loss was 12.6% and 12.1% after 1 month ($p = 0.381$), 10.4% and 10.1% after 6 months ($p = 0.129$), 9.8% and 9.5% after 12 months ($p = 0.075$), 8.7% and 8.5% after 24 months ($p = 0.151$).

Conclusion: The technology of combined treatment (YAG-LAT with phacoemulsification) is safe, effective in the treatment of POAG and co-existing cataract, and has a minimal risk of complications.

P3.24
Surgical outcomes of Xen45 gel stent implantation with the open conjunctiva approach in patients with primary open-angle glaucoma: a retrospective comparative study

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Purpose: To determine the surgical outcomes of Xen45 gel stent implantation with the open conjunctiva approach in patients with primary open-angle glaucoma (POAG).

Methods: We reviewed the medical records of patients with POAG who underwent Xen45 gel stent implantation (Xen group, 23 eyes of 21 patients) or trabeculectomy (control group, 40 eyes of 37 patients). The primary outcomes analyzed in Kaplan–Meier survival analyses were based on three criteria, with or without adjunctive medication: (A) intraocular pressure (IOP) ≤ 18 mmHg and ≥ 20% reduction in IOP, (B) IOP ≤ 15 mmHg and ≥ 25% reduction in IOP, and (C) IOP ≤ 12 mmHg and ≥30% reduction in IOP. Cox's proportional hazard regression analyses were used to assess prognostic factors for failure ($p < 0.05$).

Results: The success rates (Xen/control group) were Complete A (69.1/95.0%), Complete B (60.3/92.5%), Complete C (34.2/87.5%), Qualified A (69.1/95.0%), Qualified B (64.1/92.5%), and Qualified C (37.1/87.5%) at 6 months postoperatively (all, $p \leq 0.001$). The bleb was lower and narrower in the Xen group than in the control (all, $p \leq 0.021$). Bleb needling was performed more frequently in the Xen group (47.8%) than in the control (15.0%) ($p = 0.008$).

Conclusion: Xen45 gel stent implantation with the open conjunctiva approach and mitomycin C is considered safe and effective for IOP reduction without serious complications. Xen45 gel stent implantation may be indicated in patients with early-stage glaucoma with a target IOP of 15–18 mmHg.

P3.25
Minimally invasive glaucoma surgery with three generations trabecular micro-bypass implants in combination with cataract surgery for glaucoma: results after 1 year

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Purpose: To determine and compare the efficacy and safety of combined cataract surgery with three generations trabecular micro-bypass implants: iStent®, iStent inject®, and iStent Inject W® (Glaukos Corporation, Laguna Hills, CA, USA).

Methods: All consecutive trabecular micro-bypass stent implantations combined with cataract surgery at the University Eye Clinic in Maastricht between June 2017 and May 2021 were studied prospectively. Patients underwent standard phacoemulsification with implantation of an intraocular lens under sub-Tenon's anaesthesia, followed by implantation of the stents into the trabecular meshwork under direct gonioscopic guidance. In the iStent group one stent was implanted, and two stents were implanted in the iStent inject and iStent inject W groups. The primary outcome measure was mean IOP after one year of follow-up. Furthermore, information on IOP-lowering medication use, safety and the need for further glaucoma interventions was collected.

Results: Three hundred nine eyes were included for analysis. The majority was diagnosed with moderate or advanced glaucoma (65%), based on mean deviation of the visual field. Overall, mean ± SD IOP at baseline was 16.9 ± 4.7 mmHg with 2.6 ± 1.3 IOP-lowering medications. One year after surgery, mean IOP of the iStent, iStent inject and the iStent inject W groups was 13.1 ± 2.3 (-19%), 13.3 ± 3.7 (-21%) and 12.1 ± 2.3 (-30%) mmHg, respectively. Overall mean IOP decreased to 13.0 ± 3.2 mmHg with 1.7 ± 1.4 IOP-lowering medications, 29% of cases were medication free. The most commonly observed adverse events were mild hyphema, usually resolving within the first postoperative week, and early postoperative IOP-spikes. Within the study period, two eyes underwent further micropulse trans-scleral cyclophotocoagulation (0.6%) and one eye (0.3%) required further filtration surgery.

Conclusions: Trabecular micro-bypass stent implantation in combination with cataract surgery is safe and effective in lowering IOP and reducing the number of IOP-lowering medications.

P3.26
Intraoperative use of free conjunctival autograft in trabeculectomy due to acute conjunctival contraction

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Purpose: To present a rare case where conjunctival autograft was used in trabeculectomy in order to cover the sclera, due to acute intraoperative conjunctival contraction.

Methods: Female patient, 90 y.o., pseudophakic, one-eyed, with uncontrolled glaucoma despite full therapy. Because of chronic use of eye drops, chronic conjunctivitis, thinning of the conjunctiva and discomfort had developed. Preoperative visual acuity (VA) was 0.3 decimal and intraocular pressure (IOP) was 24 mmHg with the use of 4 medications. Postoperative follow up included photographic documentation, ultrasound and Goldmann tonometry at 3, 7 and 15 days and 1, 2, 3 and 6 months postop.

Results: During the operation, conjunctival contraction was observed, with inability to attach the conjunctiva to the limbus because of preexisting thinning. An autograft was obtained from the inferior limbus of the same eye. Four 10/0 nylon sutures were used for stabilization of the 4x4 mm autograft above the sclera flap at the limbus and to the contracted conjunctiva which was sutured as close to the limbus possible with 8/0 vicryl sutures. No antimetabolites were used. Postoperatively, conjunctival leakage was observed the first 10 days and was addressed with pressure patching. Choroidal serous detachment appeared between days 3 and 15 postoperatively. Hypotony persisted the first 15 days (IOP 6 mmHg at days 3, 7 and 15). An increase at 14 mmHg was measured at examination day 30. 10/0 sutures were removed then. At 2 and 3 months postop, IOP stabilized at 12 mmHg with use of timolol / dorzolamide fixed combination twice daily. Autograft showed homogenous vascularization after the first month and the filtering bleb appeared normal and functional Postoperative VA raised from 0.1 decimal at first month to 0.3 at 3 months

Conclusion: The use of conjunctival autograft as a last resort for covering the sclera flap during filtration surgery in a case of extreme thinning and contraction has not been reported before. Conservative therapy and close follow up can lead to a perfectly filtering bleb.

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P3.27
The long term effect of ciliary body diode (cyclodiode) ablation on visual acuity in glaucoma patients

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Purpose: Cyclodiode is effective at reducing intraocular pressure (IOP) and medication burden in glaucoma patients. However, there are concerns about the effect on long-term visual acuity (VA). We aimed to examine this effect in glaucoma patients with good visual prognosis.

Methods: This was a retrospective review of glaucoma patients who underwent cyclodiode laser ablation to the ciliary body at University Hospital Wales between 2013 and 2020. Patients with inherent acuity-threatening glaucoma subtypes were excluded. Laterality, age, latest follow-up latency, number of treatments, and complications were recorded. The following was recorded pre-treatment and at last follow-up: VA, medications, IOP, lens status, and visual comorbidities. The primary outcome was the event of significant VA drop, defined as a loss of ≥ 2 Snellen chart lines. A Wilcoxon Test of LogMAR acuity, IOP, and medication number change was used to detect any statistically significant changes.

Results: 56 eyes in 51 patients were included. The diagnoses were: primary open angle (73.21%), pseudoexfoliative (10.71%), primary angle-closure (7.14%), acute angle-closure (5.36%), phacomorphic (1.79%), and steroid-induced glaucoma (1.79%). Visual comorbidities were present in 42.86%. The average follow-up period was 3.28 years (SD 2.17 / range 0.41 – 8.21). A significant VA drop was detected in 57.14% with an average LogMAR change of +0.42 ($p < 0.00001$). Visual comorbidity status had no significant effect here. The average change in IOP was -14.27 mmHg ($p < 0.00001$) and medications, -0.55 ($p = 0.0089$).

Conclusion: Whilst IOP and medication burden are addressed by cyclodiode therapy, this appears to be at the expense of a significant risk to long-term VA.

P3.28
Combined excimer laser trabeculostomy and phacoemulsification: three-year follow-up of intraocular pressure-lowering effect and endothelial cell loss

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Purpose: To evaluate the efficacy and safety of excimer laser trabeculostomy (ELT), a laser-based trabecular minimally invasive glaucoma surgery (MIGS) combined with phacoemulsification (PHACO) surgery, in terms of intraocular pressure (IOP) reduction and endothelial cell loss after a three-year follow-up.

Methods: We present a retrospective, single-site, case series of patients with cataract and open angle glaucoma who underwent combined PHACO-ELT surgery in the last three years. Data were recorded preoperative, 1, 3, 6 months and annually. Mean outcomes were IOP, number of IOP lowering medications and endothelial cell counting (ECC), using specular microscopy.

Results: Data from 128 eyes (96 patients; 51 women and 45 men; mean age of 73 years) was gathered. Baseline IOP was 26.14 ± 3.9 mmHg (± standard deviation, SD) and preoperative medicated IOP was 21 ± 3.8 mmHg. Mean IOP after combined surgery decreased to 16.8 ± 2.3 mmHg and remained at 17.6 ± 2.3 mmHg and 17.6 ± 2.2 mmHg at one, two and three years, respectively. The number of ocular antihypertensive medication was reduced from 1.6 ± 0.8 drops preoperative to 0.33 ± 0.7, 0.39 ± 0.7 and 0.5 ± 0.9; one, two and three years after surgery respectively. In those patients who achieve 3 years follow-up, 66% are free of any IOP lowering medication. Only 5 patients required filtering surgery (deep sclerectomy). Concerning ECC, there was a significant reduction from 2246.5 ± 360.1 to 2124.3 ± 454.2 cells one month after surgery related to PHACO. ECC remained stable at 2055.1 ± 436, 2112.7 ± 363 and 2109.7 ± 321cells at one, two- and three-years follow-up.

Conclusion: The hypotensive effect of PHACO-ELT was maintained three years after surgery. This implant-free MIGS technique seems to be respectful with endothelial corneal cells in the long term.

P3.29
Safety and efficacy of PreserFlo MicroShunt in refractory glaucoma, a one year study

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Purpose: To evaluate the efficacy and safety of PreserFlo® microshunt implantation in eyes with refractory glaucoma.

Methods: In this retrospective study, a cohort of eyes who underwent PreserFlo® microshunt implantation between April 2019 and August 2020 for refractory glaucoma was evaluated. At the time of surgery, all eyes had uncontrolled intraocular pressure despite maximal tolerated medical therapy and at least one failed glaucoma filtering surgery. Primary outcome was a complete success defined as a postoperative IOP ≤ 21 mmHg with an IOP reduction ≥ 20% and no reoperation for filtering surgery. Secondary outcome was a qualified success defined as a complete success with the use of antiglaucoma medications. The rate of needling, bleb repair and postoperative complications were also collected.

Results: Forty-seven eyes with a preoperative IOP of 30.1 ± 7.1 mmHg and a mean number of treatments of 3.4 ± 1 were included. After 1 year, the mean IOP was significantly reduced to 18.8 ± 4.6 mmHg for a mean number of treatments significantly reduced to 1.4 ± 1.2. A complete success was achieved in 35% of eyes and a qualified success in 60% of eyes. A decrease in IOP of at least 30% was found in 55% of eyes. Needling or bleb repair was performed in 49% of eyes. Complications were minimal and transient except for one eye who presented with tube extrusion and another eye with tube sectioning. A new glaucoma surgery had to be performed in 17% of eyes.

Conclusion: The Microshunt PreserFlo® provided a significant reduction in IOP with a good safety profile after one year of follow-up in eyes at high risk of filtering surgery failure.

P3.30
Effectiveness and safety of the XEN 45 Gel Stent as a minimally invasive glaucoma surgery device in the management of open-angle glaucoma

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Purpose: To evaluate the effectiveness and safety of XEN 45 Gel Stent (Allergan plc, Dublin, Ireland), an ab interno gelatin stent, as a minimally invasive glaucoma surgery device in the treatment of patients with medically uncontrolled open angle glaucoma in the Mater Misericoridae University Hospital.

Methods: Prospective, non-randomised, open label, 3 year clinical study operated on by a single consultant ophthalmic surgeon in a single tertiary referral centre. Baseline characteristic were recorded, including type of glaucoma, intraocular pressure (IOP), number and type of IOP- lowering medications, and disease stage. Patients underwent surgery with implant alone or combined with cataract surgery. An adjunctive subconjunctival antimetabolite injection was delivered in all cases. Primary outcome was mean reduction in IOP and medication use from baseline at 12 months. Clinical success was defined as the percentage of eyes achieving ≥ 20% IOP reduction on the same or fewer medications at 12, 24, and 36 months.

Results: Overall, 64 eyes of 51 patients participated in the study. 48 eyes (75%), 28 eyes (43.75%), and 10 eyes (15.6%) completed the 12 month, 24 month, and 36 month visits respectively. Mean baseline IOP was 26.6 +/- 7.2 mmHg, ranging from 13 to 52 mmHg. Mean preoperative topical IOP-lowering medications were 3.1 +/- 0.8 drops. IOP reduced by 15.4 mmHg, 13.7 mmHg, and 13.9 mmHg at 12, 24, and 36 months respectively. Drops reduced by 3.0, 2.7, and 1.8 at 12, 24, and 36 months respectively. Clinical success was achieved by 81.3%, 82.1% and 70% of eyes at 12, 24, and 36 months respectively. The overall bleb needling rate was 50% (37 needlings in 32 eyes).

Conclusion: The XEN 45 Gel Stent has good IOP lowering potential with complete omission of topical IOP-lowering medication in the short term. There was a statistically significant reduction in mean IOP and mean drops from baseline at all timepoints throughout the study ($p < 0.0001$). It has a favourable safety profile and the bleb needling rate is 50%. Further long term studies are required to compare the safety and effectiveness of the XEN 45 gel stent with trabeculectomy and other MIGS procedures.

P3.31
Goniotome I/A in the treatment of primary open-angle glaucoma

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Purpose: To present the results from the use of goniotomy with I/A, for the reduction of intraocular pressure in the treatment of primary open-angle glaucoma, of the glaucoma clinic of the 2nd Department of Ophthalmology, Attikon University Hospital.

Methods: 14 eyes of 14 pseudophakic patients (7 men, 7 women) with primary open-angle glaucoma, treated with anti-glaucoma eye drops and/or tb acetazolamide peros, underwent goniotomy with built-in irrigation aspiration (Trabex®). Postoperative follow-up included photographic documentation, ultrasound biomicroscopy (UBM) and ophthalmological examination with intraocular pressure measurement the first postoperative week and the first, third and sixth month after surgery.

Results: Preoperatively, mean intraocular pressure was 21 mmHg. Average intraocular pressure the 1st week postoperatively was 12 mmHg and at the 1st month 17.2 mmHg. Patients were not given any other anti-glaucoma treatment for the first 30 days postoperatively. The mean intraocular pressure at the end of the first trimester was 15.7 mmHg and at the end of the 6 months 16.6 mmHg (22% decrease compared to preoperative measurements). Intraoperatively 4 cases developed anterior chamber bleeding. During these 6 months, 1 case required trabeculectomy. From an average of 2.3 drugs per patient before surgery, at the end of follow-up time patients used 1.9. UBM revealed excision of the trabecular meshwork in 7/14 patients.

Conclusion: The use of goniotome I/A has a high safety profile and seems to offer a reduction of 20-25% in intraocular pressure during our follow-up time. No serious intra or postoperative complications were observed in our study.

P3.32
Hydrus microstent for patients with primary open-angle glaucoma combined with cataract surgery: primary results from a retrospective case series in England

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Purposes: To evaluate the efficacy and safety of the Hydrus Microstent combined with cataract surgery at a single surgical centre in England (The Colchester Eye Centre of Excellence, East Suffolk and North Essex NHS Foundation Trust, United Kingdom).

Methods: Retrospective case series of Hydrus Microstent cases performed at the time of cataract surgery between March 2021 and December 2021. In total, 72 surgical cases were identified from 62 patients. Demographic data was collected, as well as changes in the intraocular pressure (IOP), the number of glaucoma medications and complications. All were followed by statistical analysis.

Results: There was a statistically significant reduction in IOP from baseline at all time periods analysed: 1 week, then 1, 3 and 6 months. The average preoperative IOP reduced from 18.6 ± 5.05 to 14.36 ± 5.14 at the end of 6 months follow up time. There was a significant reduction in glaucoma medications at all time periods. We found that 51.35 % of cases achieved an IOP reduction of greater than 20% and 36.49 % achieved a reduction greater than 30% at the end of 6 months follow up time. Hyphaema was the commonest complication, however washout was only required in 1 case (1.4%). Postoperative hypotony, choroidal folds or maculopathy were not reported in our study. There were no recorded complications related to cataract surgery as part of the combined procedure.

Conclusions: Our initial results suggest that Hydrus Microstent is an effective treatment for POAG when combined with cataract surgery, achieving significant reduction in IOP and reducing the need for topical glaucoma medications. There were few non-sight-threatening complications, however there was a need for additional IOP reduction in several cases. Longer follow up is required to establish the efficacy and safety of the Hydrus Microstent.

P3.33
Efficacy and safety of phacoemulsification associated with iStent Inject W® in patients with controlled open-angle glaucoma

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Purpose: To evaluate the efficacy and safety of iStent Inject W® associated with phacoemulsification in patients with controlled open-angle glaucoma undergoing cataract surgery

Methods: We conducted a retrospective, bi-centric study of patients with controlled chronic open-angle glaucoma that undergone phacoemulsification combined with the injection of two iStent inject® W between February 2020 and February 2021. These procedures were performed by thirteen different surgeons all trained for the surgical use of the trabecular micro bypass. Medical charts of patients were reviewed to collect the data, including preoperative IOP and number of hypotensive medications as well as their postoperative values at 1 week, 1 month and 6 months. The primary endpoint was the IOP reduction and the secondary endpoint was the reduction in the number of antiglaucoma medications.

Results: In this study, 58 eyes were included. The majority of patients had POAG (79% of eyes). Preoperative mean IOP was 16.2 ± 2.4 mmHg, with a mean of 2.3 ± 0.6 hypotensive medications. At one week, mean IOP was 17.1 ± 3.4 mmHg with a mean of 2.1 ± 0.6 hypotensive medication. At 1 and 6 months, mean IOP was 14.0 ± 2.2 mmHg and 13.0 ± 1.5 mmHg, with a mean of 2.0 ± 0.6 and 1.8 ± 0.5 antiglaucoma medications, respectively. The percentage of IOP reduction at 1 and 6 months was 13.5% ($p = 0.007$) and 20.0% ($p < 0.0001$), respectively. Regarding hypotensive medications, the percentage reduction in the number of antiglaucoma treatments at 1 and 6 months was 14.0% ($p = 0.405$) and 18.9% ($p = 0.002$), respectively. The main postoperative adverse events that occurred were IOP spikes in 8,6% of eyes and hyphema in one eye (1.7%), which resolved spontaneously in all cases

Conclusion: The iStent injectW® implanted during phacoemulsification effectively reduces IOP and hypotensive medications at 6 months, with a favourable safety profile, in patients with controlled open-angle glaucoma undergoing cataract surgery.

P3.34
A prospective, 24-month evaluation of subjects with mild to moderate open-angle-glaucoma treated with the OMNI® surgical system as standalone procedure

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Purpose: The OMNI® Surgical System (Sight Sciences) is indicated for canaloplasty followed by trabeculotomy to reduce intraocular pressure in adult patients with open-angle-glaucoma (OAG). The system addresses various mechanisms to reduce the resistance within the conventional outflow pathway in subjects with OAG: trabecular meshwork by titratable trabeculotomy, Schlemm´s Canal by viscodilation, and collector channels by opening hinge-like structures of their ostia. Here we report the safety and efficacy of the OMNI® Surgical System in patients with OAG treated in a stand-alone procedure in our practice. The objective was to determine the proportion of patients in whom intraocular pressure (IOP) was reduced by at least 20% and the proportion of patients who required less IOP-lowering medication up to 24 months after surgery.

Methods: The clinical observation included 38 eyes from 26 patients with OAG treated with the OMNI® Surgical System. We routinely performed the following examinations pre- and postoperatively: IOP, subjective refraction, best corrected visual acuity (BCVA), visual field pachymetry (Humphrey; Zeiss) and slit lamp examinations. Follow-up visits were done on day 1, week 1 and months 1, 3, 6, 12, 18 and 24 after surgery.

Results: 26 patients were treated with the OMNI® Surgical System. 26% of patients were pseudophakic, and the mean age at surgery was 66 ± 6 years. All patients were followed up for 12 months, and currently 10 patients (15 eyes) have been followed up for up to 24 months. Preoperatively, IOP was 24.6 ± 3.0 mmHg. At 12 and 24 months after surgery, IOP decreased to 14.5 ± 1.7 mmHg and 14.2 ± 2.0 mmHg, respectively. A reduction in IOP of at least 20% was achieved in 92% or currently 100% of treated eyes. The mean number of IOP-lowering medication was reduced from 1.9 ± 0.7 to 0.4 ± 0.6 and 0.6 ± 0.7, respectively. BCVA and visual field showed no significant changes. The complication rate was low and showed only minor complications as hyphema. No second surgery was needed over 24 months.

Conclusion: The treatment with OMNI® Surgical System is a safe and predictable surgical approach to lower IOP in patients with OAG. Current 2-year-data showed promising results, but more data needed.

P3.35
PreserFlo MicroShunt - the better trabeculectomy? Our long-term results with the microshunt in surgical glaucoma therapy

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Purpose: Over the past decade, a number of minimal invasive glaucoma surgeries (MIGS) for patients with open-angel-glaucoma (OAG) have been developed. The PreserFlo MicroShunt (Santen) is a glaucoma implant for subconjunctival drainage from an external approach. The shunt consists of Styrene-Isobutylene-Styrene which was originally developed for vascular surgery. Here we present our newest results on the effectiveness of intraocular pressure (IOP) reduction, safety and rate of complications as well as postoperative treatment and need of second surgery in patients OAG treated with PreserFlo MicroShunt.

Methods: The PreserFlo MicroShunt was implanted in 130 eyes of 96 patients as a standalone procedure. We monitored the intraocular pressure, the number of postoperative medication as well as visual acuity, visual field defects and endothelial cell loss. Regular monitoring of the filter zone by swept-source-OCT was additionally performed.

Results: 96 patients were treated with PreserFlo MicroShunt, 40% of these glaucoma patients had undergone a surgical pretreatment. 44% of patients were pseudophakic, and the mean age at surgery was 69 ± 12 years. All eyes showed a significant reduction in IOP during the postoperative observation period. The mean medicated baseline IOP was 28.3 ± 8.9 mmHg. One day postoperative the IOP decreased to 9.6 ± 4.2 mmHg, after 12 months 12.9 ± 2.4 mmHg and after 24 months 13.8 ± 3.6 mmHg. The number of medications decreased from 2.7 ± 1.2 to 0.06 ± 0.3 at month 12 and to 0.4 ± 0.9 after month 24. After a reduction, the visual acuity recovered to the original visual acuity within 2-3 weeks. Needling and revision rate depends strongly to the used concentration of MMC (0,02% to 0,04%).

Conclusion: After two years, the PreserFlo MicroShunt shows a very effective and lasting reduction of intraocular pressure. The number of complications was significantly lower compared to published data for trabeculectomy. If the IOP lowering effect prolongs over a longer period and the safety data are as good as today the PreserFlo MicroShunt could be an alternative to trabeculectomy in cases of open angle glaucoma.

P3.36
5 years-results of combined cataract surgery with iStent Inject W® in patients with cataract and open angle glaucoma

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Purpose: Over the past decade, a number of minimal invasive glaucoma surgeries (MIGS) for patients with open-angel-glaucoma (OAG) have been developed. The iStent Inject W® is the second generation of a surgical system for implantation of two microstents into trabecular meshwork to reduce trabecular outflow resistance. Given encouraging initial results, the question of a long-term sustainable effect on the intraocular pressure reduction remains. In this context, we report on our 5-year results with the iStent inject W® from our clinic.

Methods: The iStent Inject W® was used in combined surgery with phacoemulsification and intra-ocular-lens (IOL) implantation for patients with open angle glaucoma and cataract. 164 eyes of 103 patients were included into this retrospective data analysis. We monitored the development of visual acuity, intraocular pressure (IOP) and number of postoperative medications in our patients. In addition, the complication rate and necessary further other glaucoma surgery were analyzed.

Results: 164 eyes were treated, 18% of these eyes had undergone a surgical pretreatment. The mean age at surgery was 74 ± 9 years. In the context of combined surgery, the intraocular pressure dropped significantly. A significant reduction in medication requirements was also achieved. After 5 years, IOP was 21% lower than before surgery, from 19.6 ± 4.2 mmHg preoperatively to 15.4 ± 1.8 mmHg. In addition, the number of concomitant medications also decreased from an average of 1.4 ± 0.8 to 0.2 ± 0.5. We did not observe any serious complication. 6.7% of treated eyes had hyphema, 1.2% had hypotension and iris incarceration, and 4.3% had an iStent occlusion. With 5 eyes within 5 years, a new glaucoma operation was necessary. Only 7 eyes (4.3%) needed a second glaucoma intervention over 5 years.

Conclusion: The combined surgery of iStent Inject W® and IOL implantation shows a moderate but long lasting IOP lowering effect and medication reduction. The iStent implantation is easy to combine with cataract surgery with minimal additional settings and instruments. The improvement of patients adherence and quality of live due to the very low burden of additional medication are the major benefits in the treatment of patients with early to moderate OAG and cataract.

P3.37
Long-term survival analysis of the effectiveness of PreserFlo MicroShunt in open-angle glaucoma patients

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Purpose: To assess the long-term effectiveness of the PreserFlo MicroShunt (PMS) implant in primary open-angle glaucoma (POAG) patients.

Methods: Thirty eyes from consecutive patients with inadequately-controlled POAG who underwent surgery with the PMS between 2014 and 2021 were retrospectively analysed. The PMS was implanted as a stand-alone procedure with adjunctive use of mitomycin C (MMC; 0.2-0.4 mg/ml). The main outcome measure was success, defined as a postoperative intraocular pressure (IOP) ≤ 18 mmHg and an IOP reduction of at least 20%, without (complete) or with (qualified) hypotensive medication. Secondary outcomes included mean IOP reduction, reoperations, and endothelial cell loss, which was evaluated in the subset of patients with longer follow-up. A Kaplan-Meier survival analysis based on the success criteria was performed.

Results: The mean follow-up period was 36 months (up to 82). Mean age was 70 ± 12 years, and 19 patients (61%) of the study were female. Concentration of MMC was 0.2 mg/ml for 17 patients (57%) and 0.4 mg/ml for 13 patients (43%). Qualified success was achieved in 76% eyes. There was a statistically significant reduction in IOP from preoperative (21.3 ± 4.1 mmHg) to postoperative (13.2 ± 3.2 mmHg) values (-8.1 mmHg, paired t test, $p < 0.001$). Endothelial cell density reduction was also statistically significant (-408 cells/mm^2, paired t test, $p < 0.001$), with a mean monthly decrease of -6.39 cells/mm^2 from the time of surgery. No other corneal disturbances were noticed. Reintervention for surgical revision was required in two eyes at 78 and 53 months, respectively. Kaplan-Meier graphs were plotted for success criteria. No median survival time (p50) was reached for any of the two criteria. Estimated mean survival time was 149 months for postoperative IOP ≤ 18 mmHg, and 120 months for IOP reduction of ≥ 20%.

Conclusions: The PMS implant may provide a safe and effective long-lasting alternative for the surgical treatment of POAG. To the best of our knowledge, this is one of the most long-term series reporting outcomes with PMS. Further studies will be required to validate our data.

P3.38
Dual blade goniotomy in addition to usual fenestrating slits to enhance early intraocular pressure lowering in non-valved aqueous shunt surgery for primary open angle glaucoma

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Purpose: To describe a single surgeon's experience with dual blade goniotomy in addition to usual fenestrating slits to enhance early IOP lowering in non-valved aqueous shunt surgery in primary open angle glaucoma (POAG).

Methods: A retrospective chart review was conducted of all consecutive non-valved aqueous shunts with usual fenestrating slits combined with additional dual blade goniotomy performed by a single surgeon (MQ) between 10/1/2019-10/1/2021 in eyes with POAG. Eyes with prior traditional glaucoma surgery or cyclophotocoagulation were excluded. All cases were Baerveldt-350s and stented with a 3-0 Prolene ripcord, ligated with 7-0 Polysorb, and fenestrated 3 times with a spatulated SE-160-8 needle. Three patients were excluded due to missing POW4 data.

Results: Eleven eyes from 11 patients were included; mean age was 69.2 years, 5/11 were female, 11/11 were African American, 11/11 had severe stage POAG, 6/11 had prior SLT, and 2/11 had prior vitrectomy. Concurrent cataract surgery was performed in 7/11 eyes, the other 4/11 were already pseudophakic. Mean pre-op IOP was 22.2 mmHg on 3.9 meds. Mean IOP on POD1 was 17.1 mmHg, mean IOP on POW1 was 16.5 mmHg on 4.0 meds, mean IOP on POW4 was 15.5 mmHg on 4.0 meds. After the ligature dissolved at POW6, mean IOP was 11.2 mmHg on 4.0 meds. Two eyes had hyphemas < = 1.0mm at POD1 which resolved by POW1, and there were no reflux hyphemas at POW6 when the ligature dissolved. One eye had IOP spike >30 mmHg at POD1 and a different eye had IOP spike at POW1; there were no IOP spikes at POW4 or POW6. No eyes had shallow AC or other hypotony associated complications at any time.

Conclusion: When implanting non-valved aqueous shunts, excessively large fenestrating slits or early ripcord removal may carry a risk of hypotony associated complications. We demonstrate our surgical strategy that performing a concurrent dual blade goniotomy at the time of non-valved aqueous shunt implantation with the usual small conservative fenestrating slits can enhance early IOP lowering without risk of hypotony-associated complications, since the additional aqueous outflow from the goniotomy is via the physiologic outflow pathway.

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P3.39
Effect of Kahook Dual Blade (KDB) ab-interno trabeculectomy on tonographic outflow facility compared to iStent Inject

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Purpose: To compare the effects of standalone Kahook Dual Blade (KDB) ab-interno trabeculectomy and standalone iStent Inject (iStent G2 microtrabecular bypass) on tonographic outflow facility in pseudophakic glaucoma subjects.

Methods: Consecutive pseudophakic adult patients with open angle glaucoma or ocular hypertension with sub-optimal intraocular pressure (IOP) control despite maximum tolerated medical treatment were recruited. KDB was performed on the first 20 patients followed by 20 iStent injects in subsequent patients (iStent inject Trabecular Micro-Bypass System Model G2-M-IS). All patients underwent washout of all glaucoma medications before measurement of tonographic outflow facility (TOF) and IOP preop. Washout TOF and IOP measurements were repeated 3 months after the surgery.

Results: A total of 40 patients participated in the study, 20 eyes of 20 patients were included in each surgery group. 20 untreated eyes acted as control eyes. At the 3-months post-operative visit, the mean post washout IOP was reduced by 20% (25.0 ± 7.1 mmHg at baseline vs 19.6 ± 3.5 mmHg at 3 months, $p = 0.02$) whilst tonographic outflow facility was doubled (0.05 ± 0.01 µl/min/ mmHg at baseline vs 0.10 ± 0.06µl/min/ mmHg at 3 months, $p = 0.04$) from baseline in the KDB group. The iStent group showed a nonsignificant increase in mean TOF from 0.11 ± 0.08 µl/min/ mmHg at baseline to 0.15 ± 0.09 µl/min/ mmHg at 3 months ($p = 0.18$) and a nonsignificant decrease in median IOP 21 mmHg vs 18.65 mmHg ($p = 0.01$). Control eyes showed nonsignificant changes in mean IOP 20.77 ± 5.51 mmHg at baseline vs 20.51 ± 6.10 mmHg at 3 months ($p = 0.86$). TOF changes were also non-significant, from baseline 0.12 ± 0.08µl/min/ mmHg vs 3 months 0.13 ± 0.08 µl/min/ mmHg ($p = 0.88$).

Conclusion: This is the first study investigating tonographic outflow facility after KDB ab-interno trabeculectomy, compared with iStent inject. We demonstrated that there is a statistically

significant reduction in IOP which is likely related to the doubling of TOF following KDB. Patients did not show significant changes in IOP or outflow following standalone iStent procedure.

P3.40
3-year outcomes of excisional goniotomy with the Kahook Dual Blade for glaucoma in Bolivia

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Purpose: To characterize long-term intraocular pressure (IOP) and IOP-lowering medication reductions through 3 years following excisional goniotomy (EG) using the Kahook Dual Blade (New World Medical) combined with phacoemulsification in Bolivia.

Methods: This was a single-surgeon, retrospective analysis. Preoperative and postoperative IOP and medication use data were collected through 3 years of follow-up. Changes from baseline were analyzed using paired t-tests.

Results: 30 eyes of 30 patients were seen through 3 years of follow-up. Their mean (standard deviation) age was 67.2 (6.1) years, and most had primary open-angle glaucoma (63.3%) or pseudoexfoliation glaucoma (33.3%). Mean preoperative IOP was 20.8 (2.9) mmHg with subjects using a mean of 2.0 (1.2) medications per eye. Across time points (1 week, 1, 3, and 6 months, and 1, 2 and 3 years), mean IOP ranged from 13.3-15.2 mmHg ($p < 0.0001$ at all-time points). At 3 years postoperatively, mean IOP was 13.3 (3.3) mmHg (a reduction of 7.5 mmHg, 36.1%, $p < 0.0001$) and mean medication use was 0.5 (0.7) medications per eye (a reduction of 1.5 medications, 75%, $p < 0.0001$). At 3 years, 86.7% of eyes had IOP reductions >20% from preoperative baseline and 63.3% were medication-free.

Conclusion: Excisional goniotomy combined with phacoemulsification provides long-term (3-year) reductions in both IOP and the need for IOP-lowering medications in eyes with primary open angle glaucoma or pseudoexfoliative glaucoma in Bolivia.

P3.41
Effects of socioeconomic status on baseline values and outcomes at 24 months in the treatment of advanced glaucoma study (TAGS)

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Purpose: To report the correlation between socioeconomic status (SES), the baseline characteristics of participants enrolled in the Treatment of Advanced Glaucoma Study (TAGS) and the effect of SES on clinical and quality of life (QoL) outcomes at 24 months

Methods: Participants with newly diagnosed open angle advanced glaucoma in at least one eye [Hodapp-Parrish-Anderson (HPA)] were recruited. When both eyes were eligible, the same intervention was undertaken in both eyes and the index eye for analysis was the eye with the less severe visual field mean deviation (MD). Social deprivation was defined by the index of multiple deprivation (IMD). Correlation between IMD scores and clinical and QoL baseline characteristics was tested with the Chi-squared test of association for dichotomous variables and Pairwise Pearson's correlation for continuous variables. Clinical outcomes at 24 months were evaluated for effect of SES for the cohort as a whole and between treatment arms and within treatment arms

Results: Four hundred and fifty-three patients were recruited. The mean visual field MD was -17.2 (6.7) dB for the most deprived quintile of participants and -13.0 (5.5) for the least deprived quintile in the index eye. At diagnosis there was a strong correlation between social deprivation and ethnicity, age, extent of visual field loss (in the index and non-index eye) and number of visits to opticians in the 10 years prior to diagnosis. At 24 months SES had no effect on between or within treatment groups for clinical or QoL outcomes.

Conclusion: In patients presenting with advanced glaucoma social deprivation at baseline is correlated with poorer visual function, poorer VFQ-25 score, ethnicity, age and number visits to an optician in the years preceding diagnosis. SES at baseline however does not have an effect of the success of treatment within or between interventions at 24 months.

P3.42
Early results of irrigating goniectomy with TrabEx+: a novel device for the treatment of open-angle glaucoma

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Purpose: The aim was to describe the efficacy and safety of irrigating goniectomy performed using the TrabEx+ device, either as a standalone procedure or combined with cataract surgery, in eyes with medically treated open-angle glaucoma.

Methods: A retrospective case series of eyes treated by a single surgeon at a single UK teaching hospital. Data was collected at follow-up visits at 1 week, 3, 6, 12, 18 and 24 months postoperatively. Primary outcomes included intraocular pressure (IOP) and glaucoma medication reduction after surgery. Proportion of eyes achieving > 20% IOP reduction, IOP < 21 mmHg, and no re-operation were classified as surgical success.

Results: 73 consecutive eyes of 64 patients (mean age 68.4 ± 13.7 years) were enrolled with a mean follow-up of 16.1 ± 10.3 (range 3-38) months. 62% were treated as combined procedures with cataract surgery. Overall, mean IOP decreased from 31.3 ± 7.3 to 20.9 ± 10.4 mmHg at the latest follow-up (34% reduction) ($p < 0.001$) with mean preoperative medications decreased from 2.9 ± 1.2 to 1.9 ± 1.3 ($p < 0.001$). 73% met the definition of success at latest follow up. Postoperative complications were recorded including hyphaema (17%), hypotony (1%), uveitis (3%) and persistent vitreous haemorrhage (1%). 18% required reoperation due to treatment failure.

Conclusion: TrabEx+ appears to be effective in lowering IOP and medication with or without cataract surgery. However, long term safety and efficacy will be better understood in a prospective study with longer follow-up.

P3.43
Double is better than one

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Purpose: To evaluate the efficacy and safety of double minimally invasive glaucoma surgery implants with a subconjunctival drainage approach: the XEN45 Gel Stent" (Xen).

Methods: Retrospective comparative case series of primary open angle glaucoma (POAG) patients with at least 1 year of follow-up after a second Xen implantation. Results: 8 eyes of 8 patients underwent Xen implantation. Baseline characteristics were similar, all patients had undergone cataract surgery.

Results: Mean baseline IOP standard deviation dropped from 30 ± 4.0 to 22.37 ± 3.8 mmHg after first Xen implant. After the second Xen implant the mean iop dropped to 16,12 ± 3.1. Postoperative complications were usually mild and self-limiting. No one needed bleb needling or other surgery after second XEN; however 3 patients needed medical therapy to reach out IOP target (< 16 mmHg).

Conclusion: A double Xen Gel Stent implantation achieved good results in POAG eyes in terms of IOP-lowering and surgical safety.

P3.44
Will the PreserFlo™ MicroShunt replace trabeculectomies? Results of a UK and Éire Glaucoma Society (UKEGS) Survey

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Purpose: The PreserFlo™ MicroShunt is a novel glaucoma device, mimicking the drainage mechanism of a trabeculectomy, which has been adopted for use in the UK. The aim of this study is to evaluate the attitudes of UK glaucoma specialists to the current and future use, and appropriate patient populations, for both augmented trabeculectomy and PreserFlo™ MicroShunt procedures.

Methods: An online questionnaire was distributed to all UK and Éire Glaucoma Society (UKEGS) members during November 2021.

Results: Forty-three glaucoma consultants completed the survey. All respondents undertook augmented trabeculectomy surgery. The median number of trabeculectomies undertaken was 50 annually, prior to the COVID-19 pandemic. Twenty-two respondents (51%) undertook PreserFlo™ MicroShunt procedures; the median number undertaken over the last year was 22. Respondents estimated that 50 trabeculectomies (median) and 10 PreserFlo™ MicroShunt procedures (median) needed to be undertaken for a surgeon to be considered competent in these procedures. Of those who undertook both procedures, 90% anticipated the number of trabeculectomies they performed would decrease whilst 75% expected their PreserFlo™ MicroShunt usage to increase. Seventy-two percent of participants felt that the PreserFlo™ MicroShunt was suitable for patients with early visual field loss, 39% for patients with severe visual field loss and 21% for normal tension glaucoma. Respondents cited that the PreserFlo™ MicroShunt required less theatre time, fewer outpatient post-operative visits, less post-operative interventions and was a better experience for patients. Intraocular pressure outcomes were considered the most important measure of success, with a clinically important difference between these two procedures being 2-3 mmHg (41% of respondents) or >3 mmHg (49% of respondents). Of those not currently using the PreserFlo™ MicroShunt, 65% expected to begin usage in the future.

Conclusion: The findings suggest that surgeons already using the PreserFlo™ MicroShunt will increase its usage and perform less trabeculectomies in the future, whilst the majority of specialists not currently using this device anticipate doing so later. UK glaucoma specialists believe the PreserFlo™ MicroShunt has a shorter learning curve and requires less theatre time, post-operative follow-ups and interventions compared to a trabeculectomy.

P3.45
Trabecular microbypass iStent Inject W implantation combined with cataract surgery in open-angle glaucoma eyes - 12-month outcomes

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Purpose: To evaluate the effectiveness (lowering medication) of a single trabecular microbypass stent (iStent Inject® W, Glaukos) implantation in combination with phacoemulsification in open-angle glaucoma eyes over a 12-month period.

Methods: Non-randomized, single-centre, retrospective case series of glaucoma eyes undergoing iStent Inject W implantation combined with phacoemulsification. Adult patients with no prior glaucoma surgery and intolerant or non-compliant with medications were eligible for inclusion. Primary outcome effectiveness measures include reduction number of glaucoma medications and stabilization of intraocular pressure (IOP).

Results: 30 eyes of 24 patients (mean age 74.9 ± 8.4) were included in this study. Mean baseline IOP was 17.7 ± 3.5 mmHg and was reduced to 16.1 ± 2.6 and 15.7 ± 2.5 at 6- and 12 months respectively ($p = 0.002$). Mean number of medications was 2.3 ± 1 at baseline and was significantly reduced to 0.7 ± 0.9 at 12 months ($p < 0.001$; -68%). No eye was medication free at baseline versus 50% (n = 15) at 12 months (Fig. 1). In controlled glaucoma eyes (≤18 mmHG at baseline), mean IOP was stable (15.5 ± 2.1 at baseline; 15.3 ± 2.4 at 12-month) while medications were reduced from 1.9 ± 0.7 at baseline to 0.5 ± 0.6, whereas in uncontrolled glaucoma eyes (>18mmHG at baseline) both IOP and medications were reduced from 20.7 ± 2.5 and 2.7 ± 1.2 at baseline to 16.2 ± 2.6 and 1.1 ± 1.1 at 12-month respectively. No eyes have experienced loss of best corrected visual acuity. There was no statistically significant change in retinal nerve fiber layer (RNFL) thickness at 12 months ($p = 0.32$). No eyes have experienced adverse events such as postoperatively IOP spikes or hyphema.

Conclusion: iStent Inject W implantation combined with phacoemulsification results in a significant reduction in mean glaucoma medications in glaucoma eyes. IOP was also reduced and there was no loss of visual acuity or RNFL. In uncontrolled IOP eyes, the stent implantation has brought IOP under control and reduced the number of medications, while in controlled IOP

eyes, it has lowered the number of medications.

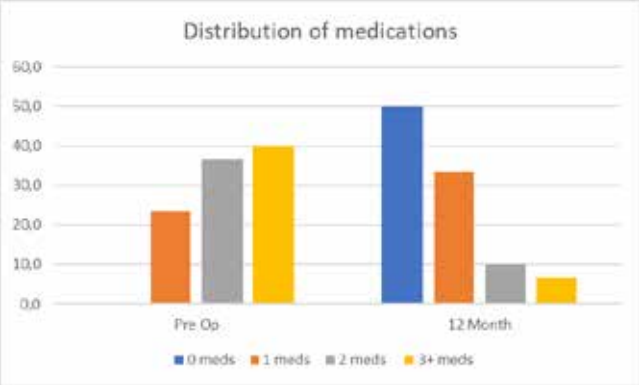

Figure 1. Distribution of medications (%).

P3.46
Canaloplasty and trabeculotomy with the OMNI system in pseudophakic patients with open-angle glaucoma: the ROMEO II study

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Purpose: To retrospectively assess the safety and effectiveness of ab-interno transluminal viscoelastic delivery and trabeculotomy performed using the OMNI Surgical System (Sight Sciences Inc, Menlo Park, CA, USA) as a standalone procedure on intraocular pressure (IOP) and the use of ocular hypotensive medications in patients with open-angle glaucoma (OAG) and IOP > 18 mmHg.

Methods: Retrospective, observational, multicenter, consecutive, case series IRB approved study at 13 investigative sites in the USA. Eligible patients were adults, pseudophakic with OAG, preoperative IOP >18 mmHg on 0-4 ocular hypotensive medication, and treatment with the OMNI Surgical System 12 months (273-456 days) prior to inclusion in the study. All eligible patients were included sequentially by date of surgery. Outcome measures at 12 months included percent change in IOP from pre-operative baseline, mean IOP, and mean number of ocular hypotensive medications.

Results: Sixty cases were included. Average (SD) age was 74.5; 80% were White; MD was -4.7 (3.4) dB. Mean preoperative IOP was 22.7 (4.0) mmHg on an average of 1.9 (1.4) medications. IOP was reduced to 17.7 (5.6) and 17.1 (5.4) mmHg at 6 and 12 months (both $p < .00001$) respectively. For eyes with baseline IOP ≥ 21 and 25 mmHg, IOP mean IOP reduction was 6.6 (-27%) and 9.5 (-34%) mmHg respectively. Medications were reduced to 1.4 at Month 6 ($p < .0001$) or 1.6 ($p < .05$) at Month 12. The most common adverse events were hyphema > 1 mm, mild inflammation, decrease in best corrected visual acuity (all 3/60, 5%) and IOP spike (2/60, 3%). There were no serious adverse events. Four (6.7%) eyes required secondary surgical intervention.

Conclusion: OMNI was found to provide effective reduction in IOP and in medication usage where, preoperative IOP was > 18 mmHg, for up to 12 months postoperative in pseudophakic patients with mild to moderate OAG. No safety issues were identified based on the analysis of AE.

P3.47
Trabeculectomy versus the PreserFlo MicroShunt: a comparison of their efficacy and safety at Addenbrooke's Hospital, Cambridge University Hospitals (CUH) NHS Foundation Trust

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Purpose: To assess whether the PreserFlo MicroShunt could be a suitable alternative to trabeculectomy for medically uncontrolled intraocular pressure.

Methods: The cohort included patients with primary open angle glaucoma on maximum tolerated medical therapy requiring surgical intervention at CUH. We compared data collected on the first 46 patients who underwent insertion of the PreserFlo device to 27 patients who underwent trabeculectomy during this time (01/03/2021 to 10/12/2021). A standardised operative technique was followed for both procedures involving mitomycin C 0.4mg/ml for PreserFlo and 0.2mg/ml for trabeculectomy. All surgeons undertaking PreserFlo surgery were trained and certified by Santen Pharmaceutical Co., Ltd. Reduction in IOP and number of glaucoma medications post-operatively were used as a measure of efficacy and the rate of reoperations or procedures as a measure of safety. Visual acuity was also recorded to check for any significant deterioration at month 6. Time points analysed: pre-operative, day 1, week 1, month 1, month 3 and month 6.

Results: The percentage reduction in IOP at D1 and W1 from pre-operative pressures was significantly larger in PreserFlo patients ($p = 0.002$, $p = 0.028$). There was no significant difference in pressure reduction at M1 and M3 ($p = 0.689$, $p = 0.275$), but the reduction was significantly larger in trabeculectomy patients compared to PreserFlo at M6 (0.012). This is due to a gradual increase in PreserFlo pressures as seen in Table 1. Average pre-operative pressures were 21.6 ± 6.48 mmHg for the PreserFlo cohort and 26.5 ± 12.0 for trabeculectomy.

Table 1. Average percentage IOP reduction from pre-operative pressure

Time point	PreserFlo (%)	Trabeculectomy (%)
D1	67.6 ± 22.5	26.5 ± 12.0
W1	63.7 ± 15.5	46.9 ± 32.5
M1	48.4 ± 27.7	48.0 ± 42.3
M3	49.5 ± 26.9	56.7 ± 23.5
M6	41.4 ± 15.2	55.9 ± 16.8

Re-introduction of IOP-lowering medication was required in 8% (3/37) of PreserFlo and 85% (22/26) of trabeculectomy patients by M3. 4% (2/46) of PreserFlo patients required a post-operative procedure/reoperation compared to 19% (5/27) of trabeculectomy patients.

Conclusion: PreserFlo significantly reduces intraocular pressure in glaucoma patients and this reduction is comparable to trabeculectomy. PreserFlo patients also required fewer procedures and IOP-lowering medications post-operatively. However, we highlight the importance of following these patients to check for pressure increases at month 12, which may exceed target.

P3.48
Changes in corneal endothelial cell density after aqueous shunt surgery and trabeculectomy in patients of Black African or African-Caribbean origin: 1 year follow-up

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Purpose: To evaluate the corneal endothelial cell density (ECD) in patients of Black African or African-Caribbean origin undergoing glaucoma surgery for uncontrolled glaucoma.

Methods: Single centre prospective cohort study analysing 49 patients with uncontrolled primary open angle glaucoma on maximal medical therapy. Fifteen eyes underwent primary trabeculectomy with Mitomycin C (MMC), 17 eyes underwent primary Baerveldt Glaucoma Implant (BGI) with MMC and 17 eyes underwent primary BGI without MMC. The MMC dosage used during surgery was 0.4mg/ml (0.04%). Corneal ECD was measured by non-contact specular microscopy at baseline, 6 months and 12 months after surgery.

Results: Baseline central corneal thickness values (µm) were 502.4 ± 21.2 (trabeculectomy), 503.9 ± 13.8 (BGI with MMC) and 502.1 ± 19.3 (BGI without MMC). Baseline ECD (cells/mm²) were 2341.9 ± 134.6 (trabeculectomy), 2298.9 ± 194 (BGI with MMC) and 2405.7 ± 133.5 (BGI without MMC). At 6 months the ECD decreased to 2313.5 ± 140.5 (trabeculectomy), 2241.7 ± 214.1 (BGI with MMC group) and 2327.9 ± 152.9 (BGI without MMC). By 12 months the ECD returned to around baseline in the trabeculectomy group (2329.7 ± 128.9) but with a slight further reduction in the BGI with MMC group (2172.8125 ± 171.1) and in the BGI without MMC group (2297.9 ± 152.5). No significant differences were detected in comparisons between trabeculectomy and BGI with MMC (p = 0.879), trabeculectomy and BGI without MMC (p = 0.767) or BGI with MMC and BGI without MMC (p = 0.609).

Conclusion: Whilst corneal ECD generally decreased over time in our cohort, this appears to be at a lesser rate in comparison to similar studies in mainly Caucasian and Far East Asian populations. Further research is required to elucidate the long terms effects of glaucoma surgery on corneal ECD in this population.

P3.49
Trabeculectomy versus Xen gel implant for the treatment of open-angle glaucoma: a 4-year retrospective analysis

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Purpose: To compare two surgical techniques evaluating efficacy, safety, and postoperative management over 48 months of follow-up.

Methods: This is a retrospective clinical cohort study aiming to compare the outcome of trabeculectomy surgery and XEN gel implant in patients suffering from uncontrolled glaucoma. The patient selection was based on the following inclusion criteria: uncontrolled intraocular pressure (IOP) on maximally tolerated medical therapy, healthy conjunctiva freely mobile in the superior sector, open-angle, glaucomatous visual field damage, follow-up of at least 48 months. Subjects enrolled in the study included 34 XEN gel implants and 34 glaucoma matched patients who underwent trabeculectomy. We set the lower limit at 6 mmHg and the upper limit ≤ 12 mmHg for criteria A, upper limit to ≤ 15 mmHg for criteria B and upper limit ≤ 18 mmHg for criteria C. Criteria for success were met when the target IOP was achieved without (complete success) or with IOP-lowering medications (qualified success).

Results: In all the analysis, trabeculectomy was proved to be superior to XEN gel implant. If complete success was taken into consideration, the log-rank test for criteria A was statistically significant (p = 0.032), not significant for criteria B (p = 0.08) and not significant for criteria C (pp = 0.35). As regards qualified success, trabeculectomy was shown superior to Xen gel for criteria A, B, and C (p = 0.021, p = 0.06 and p = 0.19, respectively). Higher number of post-operative flat chamber and bleb leakage was observed in the trabeculectomy group.

Conclusion: During a 4-year follow up, the lowering of the IOP was shown to be greater and more prolonged with the gold-standard technique when compared to the XEN gel implant. However, Xen gel implant techniques offer a better safety profile in terms of post-operative complications.

P3.50
Micropulse laser trabeculoplasty (MLT): a promising treatment for open angle glaucoma

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Purpose: The aim of the study was to evaluate effectiveness and safety of MLT in the treatment of open-angle glaucoma (OAG).

Methods: A total of 30 consecutive eyes of 21 patients > 18 years old with OAG over a one-year period, were included in this study. Subjects included had IOP≥21 mmHg and open angle on gonioscopy. Exclusion criteria were angle closure glaucoma, secondary glaucoma and prior laser trabeculoplasty. Subjects were further categorized into three study groups a: patients without any treatment, b: patients using IOP lowering eye drops, c: patients using both eye drops and systemic lowering drugs. A session of MLT treatment was performed using a 577 nm diode laser to 360° of the trabecular meshwork with 300µm spot size and 1000 mW power. Subjects were followed up after 1 week, 1 month, 3-6 months and one year. Three sessions of MLT were performed and medications were titrated up or down to achieve IOP reduction.

Results: In the first group, IOP was reduced 20%, without need to administer lowering IOP eye drops. In the second group, IOP was reduced up to 25% and in 10% IOP was significantly reduced (40%), thus eye drops were discontinued. However, in 15% of the second group IOP decrease was not achieved. In the third group, 1 patient did not respond to MLT, 1 presented with 40% IOP decrease during 3 months but after 6 months IOP was uncontrolled and in 1 patient steady 40% IOP reduction was noticed, therefore systemic lowering IOP medications were discontinued. A 5% of subjects presented with mild anterior uveitis and IOP spikes were not observed.

Conclusion: MLT proved to be an effective and safe procedure for

the treatment of OAG. It can be considered for initial treatment. MLT can also be an adjunct therapy to glaucoma eye drops. However, long term effectiveness of MLT for controlling IOP in subjects using maximal number of glaucoma eye drops or systemic IOP drugs is limited.

P3.51
Surgical outcomes of ab interno viscocanaloplasty (ABIC) combined with cataract surgery in open-angle glaucoma: 36-month results

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Purpose: Ab interno viscocanaloplasty (ABIC) derives from ab externo viscocanalostomy and involves the catheterization of Schlemm's canal with a flexible microcatheter through which viscoelastic material is injected to dilate the canal and its surrounding structures on 360°.The aim of this study was to analyze the safety profile and efficacy of ABIC through to 36 months post-operatively.

Methods: In this retrospective study carried out at a tertiary ophthalmology centre, all patients who underwent ABIC between January 2016 and January 2017 were retrospectively enrolled, and their medical records were analysed. Complete success was defined as a 36-month reduction in intraocular pressure (IOP) ≥ 20% from baseline with no concomitant medications. Qualified success criteria were identical, with no more medications than at baseline. When longer follow-up periods were available, mean IOP and medications were reported at the last visit.

Results: In all, 30 eyes of 25 patients were analysed, with a mean follow-up time of 42.3 ± 4.6 months. Mean IOP decreased from 25.9 ± 9.2 mmHg preoperatively to 13.8 ± 4.0 mmHg (-46.7%; $p < 0.001$) at the last visit. Concomitantly, the number of medications dropped from 3.4 ± 0.9 to 1.0 ± 1.2 (-70.6%; $p < 0.001$). Complete success at 36 months was achieved in 20% of eyes, and qualified success in 53%. Amongst eyes with a baseline MD < -9 dBs, 20% and 100% achieved complete and qualified success, respectively, and 66.7% of eyes that had previously undergone filtering surgery achieved both complete and qualified success, with a mean 3-year IOP of 10.7 ± 3.2 mmHg. A total of 14 eyes (46.7%) were considered surgical failure due to uncontrolled IOP, 8 of which (26.7%) required further filtering surgery. Sixteen adverse events were observed during the follow-up period, with IOP spikes > 30 mmHg during the first post-operative week being the most common complication (36.7%).

Conclusion: ABIC achieved a statistically significant reduction in IOP and anti-glaucoma medications through 3 years of follow-up, with a favourable safety profile. It may be a valid technique to allow long-term control of IOP in mild-to-severe open-angle glaucoma, including after failed filtering surgery.

P3.52
XEN-augmented deep sclerectomy: surgical outcomes and comparison with non-penetrating deep sclerectomy at 6 months

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Purpose: Non-penetrating deep sclerectomy (DS) was shown to be as effective as trabeculectomy with a superior safety profile. However, DS can be technically difficult to master and requires frequent post-operative interventions. While XEN gel stents are not as technically demanding and exhibit a favorable safety profile, they are prone to subconjunctival fibrosis. A new technique, XEN-augmented deep sclerectomy (XEN-DS), was designed to draw on the strengths of both traditional DS and XEN gel stents to produce a safer and more effective surgical technique. The aim of this study was to evaluate the safety profile and efficacy of this novel glaucoma procedure.

Methods: In this retrospective study carried out at a tertiary ophthalmology centre, all patients who underwent XEN-DS between December 2005 and February 2020 were retrospectively enrolled. A severity-matched group of patients having undergone DS with the same surgeon over the same period was retrospectively enrolled. Success at 6 months was defined as an unmedicated intraocular pressure (IOP) of 15 mmHg or less, in conjunction with a relative IOP reduction from baseline of at least 20%.

Results: In all, 49 eyes of 43 patients were retrospectively included: 27 underwent DS and 22 underwent XEN-DS. Mean IOP in the DS and XEN-DS respectively decreased from 25.0 ± 7.9 mmHg and 30.0 ± 8.7 mmHg preoperatively to 11.8 ± 4.7 mmHg (-52.8%; $p < 0.001$) and 13.9 ± 4.4 mmHg (-53.7%; $p < 0.001$) 6 months postoperatively ($p = 0.375$). The number of medications concomitantly dropped from 3.4 ± 0.7 and 3.4 ± 0.7 to 0.3 ± 0.9 (-91.2%; $p < 0.001$) and none (-100.0%; $p < 0.001$), respectively ($p = 0.227$). Complete success was achieved in 63.0% of DS eyes and 72.7% of XEN-DS eyes. Laser goniopunctures were required in 6 eyes following DS (23.1%). Needling revisions were performed in 2 eyes (7.7%) of the DS group, and one in the XEN-DS group (4.5%). Postoperatively, 19 and 8 adverse events were observed in the DS and the XEN-DS groups respectively.

Conclusion: This study suggests that DS and XEN-DS have similar IOP-lowering potentials, but XEN-DS has a superior safety profile and lower rates of post-operative interventions at 6 months.

P3.53
8-year follow-up of excimer laser trabeculostomy (ELT): clinical outcomes

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Purpose: To evaluate the 8-year, long-term data of IOP-lowering efficacy and safety of Excimer Laser Trabeculostomy (ELT), both as

a stand-alone procedure and combined with phacoemulsification (ELT+Phaco) in patients with open-angle glaucoma (OAG) and in patients with co-existing OAG and visually significant cataract.

Methods: 164 eyes were followed for 8 years. 90 out of 164 eyes with OAG or ocular hypertension treated with medications underwent ab-interno Excimer Laser Trabeculostomy. 74 of the 164 eyes with medically-treated OAG or ocular hypertension in addition to lens opacity underwent ELT combined with phacoemulsification. Patients were followed post-operatively at 1 day, 1 week, 3 months, and every year thereafter until 8 years after initial treatment. The primary outcome measures were change in IOP from baseline (without washout) and number of glaucoma medication. Secondary outcome measures were change in visual acuity (BCVA), surgical complications, and adverse events (AE).

Results: At 8 years post-treatment, the mean IOP in the ELT alone group reduced from 22.17 ± 7.0 mmHg to 15.9 ± 3.5 mmHg (n = 19). The mean IOP in the ELT+Phaco group reduced from 21.9 ± 6.44 mmHg to 13.7 ± 2.8 mmH 8 years after treatment. Number of medication at baseline in the ELT alone group was 1.85 ± 0.8 and decreased to 1.4 ± 1.4 at the 8 year mark. The number of medication for the ELT+Phaco group was 1.58 ± 0.8 before treatment and reached 1.85 ± 0.7 8 years after the treatment. gHgHG

Conclusion: ELT, both as a stand-alone MIGS procedure and in combination with phacoemulsification is clinically safe and effective and demonstrates long-term IOP-lowering efficacy and decrease use of IOP-lowering medications. Benefits of this laser-based implant-free MIGS procedure include a high safety profile and long-term efficacy.

P3.54
Choroidal effusion and hypotony maculopathy after PreserFlo MicroShunt

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Purpose: To describe a case of unexplained hypotony following a preserflo Microshunt implantation

Methods: Fifty nine-year-old female with progressing, uncontrolled open angle glaucoma underwent an uneventful PreserFlo MicroShunt implantation. The listing intraocular pressure (IOP) was 27 mmHg. The IOP dropped to 12 mmHg a week after the preserflo microshunt surgery. The patient presented to eye casualty two weeks after the procedure with choroidal effusion and a shallow AC. The IOP then was 12 mmHg. This was initially treated with tapered steroids to promote faster healing and atropine. The intraocular pressure on her following visits was 9 mmHg and the choroidal effusion progressed. She had several injections of healon into the AC in order to increase the pressure and address the shallow AC, but this treatment did not help, the AC went back to shallow anatomy and the choroidals remained the same.

Results: Patient underwent a further procedure with a tube ligation after which the pressure has gone up and the choroidals resolved.
This is a case of unexplained hypotony, in a young patient, with no previous history of myopia or previous ocular surgeries. The intraocular pressure following the preserflo implantation was 12 mmHg which is a good target pressure. Despite that, the patient developed choroidal effusion and hypotony maculopathy.

Conclusion: Hypotony despite "within the range" IOP is possible following preserflo microshunt and may be corrected with tube ligation.

P3.55
Shallow anterior chamber as a complication after trabeculectomy in a patient with primary open angle glaucoma and chronic anterior uveitis

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Purpose: The aim of this study is to present a possible complication after trabeculectomy surgery in a patient with chronic uveitis and open angle glaucoma

Methods: A case report from our clinical practice.

Results: A 72 years-old woman diagnosed with POAG presented in our clinic with complaints of decreased vision and redness mainly in the left eye for several months. On the clinical evaluation we observed bilateral uveitis with granulomatous keratic precipitates, cells in the anterior chamber and a high intraocular pressure in the left eye. A therapy with Acyclovir, Acetazolamide, local steroid drops and antiglaucoma drops was initiated. Despite the maximal conservative therapy and decreased signs of inflammation the high intraocular pressure of 38 mmHg in the left eye remained. A standard trabeculectomy was performed on the background of no signs of active inflammation and perioperative prophylaxis with Acyclovir and Methylprednisolone. The day after the surgical intervention a shallow anterior chamber with hypotony was observed. The complication was managed successfully with combined surgical and conservative treatment. A month after the intervention the patient had no sings of inflammation, had a deep anterior chamber and normal IOP of 16 mmHg in the right eye and 14 mmHg in the left one.

Conclusion: The shallow anterior chamber combined with hypotony is frequently seen following trabeculectomy. The success of glaucoma surgery is lower in eyes with uveitic glaucoma and surgical interventions are associated with a higher incidence of postoperative complications. However, there is not enough data about the frequency of this complications in patients with POAG combined with chronic uveitis, and further investigations for the possible treatment methods and the risk factors for failure of the surgery are necessary.

P3.56
Surgical outcomes of Schleem's canal peeling in eyes with open-angle glaucoma

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Purpose: To examine the efficacy and safety of Schleem's canal peeling in patients with open angle glaucoma.

Methods: This was a retrospective study. We dissected Schlemm's canal away from the canal with a 23-gauge microvitreoretinal blade, and totally stripped the canal for about 100° to 180° in 20 eyes of 20 patients. Data included preoperative and postoperative IOP and medications, complications, and need for reoperation for IOP control.

Results: Mean follow-up time was 12.2 ± 1.3 months and mean age was 61.1 ± 4.8. Mean IOP was 20.3 ± 2.9 mmHg preoperatively and 14.5 ± 2.8 mmHg at last visit (p < 0.001). Mean number of medications decreased from 3.4 ± 0.4 preoperatively to 1.08 ± 0.9 at last visit (p < 0.001). Only three eyes developed transient hyphaema.

Conclusion: Schleem's canal peeling (a novel technique) is safe and effective alternative in decreasing IOP and need of medication in patients with open angle glaucoma.

P3.57
Long term survival of filtering bleb after trabeculectomy surgery in cataract patients

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Purpose: To study the real-world data of survival of the filtering bleb after trabeculectomy and identify predisposing factors of long term filtering bleb failure in patients who developed cataract during the follow up period. This study aims to compare the rate of surgical failure after trabeculectomy followed by phacoemulsification vs trabeculectomy alone for 5 years.

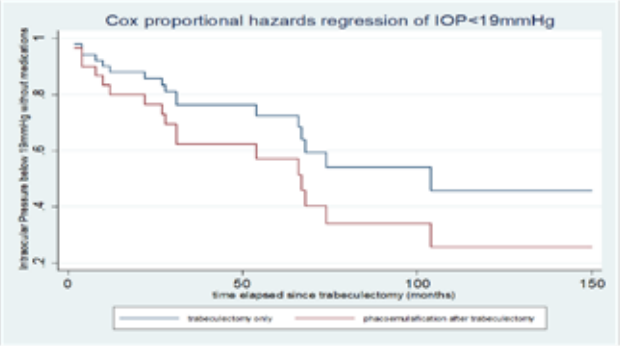
Methods: Retrospective study of medical records of primary angle glaucoma (including pseudoexfoliative glaucoma and normal tension glaucoma) patients who had had trabeculectomy operation (Safe Trabeculectomy Technique with mitomycin or 5-fluorouracil) in General Hospital of Lamia. Trabeculectomy was performed with 0.02% MMC or 5-Fluorouracil and limbus based-conjunctival incision. Cataract surgery (phaco) was performed with temporal clear corneal incision, excluding extracapsular cataract extraction. Data on intraocular pressure (IOP), visual acuity, visual fields progression, cataract operation and glaucoma medication were recorded. Survival analysis and longitudinal data modelling using STATA was applied. Success was defined as IOP less than 19 mmHg at all timepoints postoperatively either without medication (absolute success) or with medication (qualified success)

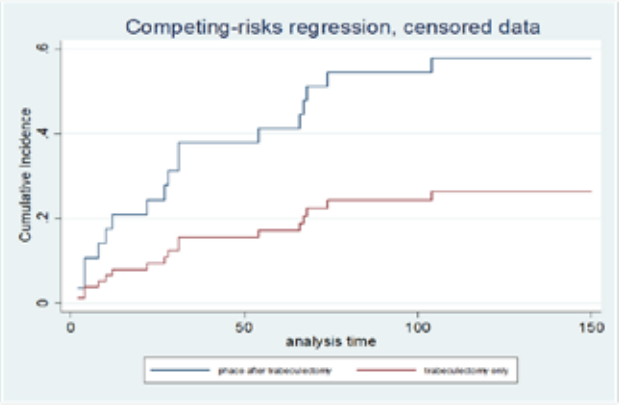
	Trabeculectomy alone n = 9 (12 eyes)	Phaco after trabeculectomy n = 18 (24 eyes)	
Women / men	6/3	9/9	p = 0.411
Age (median)	76 (53-94)	70 (61-85)	p = 0.08
Eye (R/L)	7/5	11/13	p = 0.48
Preoperative IOP (mmhg)	24 (22-29)	25 (23-28)	p = 0.2565
Preoperative medication (1/2/3/4)	2/1/4/5	0/3/11/10	Fischer's exact = 0.279
Antimetabolite (5FU/MMC)	5/7	7/17	Fischer's exact = 0.479
Follow-up (months)	43.5 (5-95)	77.5 (18-150)	p = 0.0083
Time from trabeculectomy to phaco	NA	16.5 (2-115)	

	Trabeculectomy alone (12 eyes)	Phaco after trabeculectomy (24 eyes)	
IOP at the end of follow-up period (median)	14 (8-20)	15 (8-21)	p = 0.6443
Postoperative medication (0/1/2/3/4)	10/2/0/0/0	12/4/6/1/1	Fischer's exact = 0.235
Additiional glaucoma procedures	needling (1)	2nd trab (3) revision 1	
IOP > 18 mmHg, without medications	3/12	14/24	p = 0.0522
Trabeculkectomy's "age" at the time of phaco (coefficient for "failure")	1.085		0.049 95% CI [.003 2.166]

Results: Time to bleb failure (IOp > 18 mmHg, without medications) varied between patients in relation to time elapsed since trabeculectomy and the time of cataract operation performed after glaucoma surgery. In a minority of patients use of topical glaucoma medication was required at some time point postoperatively to maintain IOP less than 19 mmHg. Additional glaucoma surgery to obtain the desirable level of IOP was needed in both groups. Visual field progression was not strongly correlated with IOP levels. No patient lost vision after trabeculectomy surgery.All patients experienced vision improvement after cataract surgery.

Conclusion: long term efficacy of trabeculectomy with antimetabolites in real world has been proven. Additional use of glaucoma medication-if needed for superior IOP control- may be applied without compromising the remaining function of the bleb. Cataract operation (phacoemulsification) improves vision but some deterioration in bleb's function must be expected in patients with primary open-angle glaucoma and exfoliation glaucoma. A longer time gap between trabeculectomy and phacoemulsification leads to better outcomes of trabeculectomy.





P3.58
Efficacy of phacoemulsification and phacoemulsification in combination with goniosynechiolysis in the surgical treatment of chronic angle-closure glaucoma: 2-years study

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Purpose: To investigate the degree of the anterior chamber opening and decrease of intraocular pressure (IOP) after phacoemulsification with IOL implantation (Phaco) and Phaco combined with goniosyneciolisys (GSL) in patients with primary chronic angle-closure glaucoma.

Methods: The study involved 28 patients (28 eyes) with primary chronic angle-closure glaucoma. They were divided into two groups: the first group - 15 patients who underwent Phaco, and the second group - 13 patients who underwent Phaco with GSL. The minimum follow-up period was 24 months. The indication for Phaco was an increase IOP more than 22 mmHg, appositional closure of the anterior chamber angle (width of the anterior chamber angle ≤10° - Shaffer 1) and the presence of glaucomatous optic neuropathy, and indication for Phaco with GSL was synechial closure of the anterior chamber angle.
The presence of synechial anterior chamber angle block was determined intraoperatively. After phacoemulsification to open the anterior chamber angle viscoelastic was introduced. Examination of the anterior chamber angle was performed using a Mori surgical gonio lens.

Results: In the postoperative period, the anterior chamber angle in the first group opened to more than 20° in all quadrants, in the second group the anterior chamber angle opened more to than 20° in at least three quadrants. In the first group IOP before surgery was 29.1 ± 3.9 mmHg and after 24 months - 19.6 ± 0.9 mmHg ($p < 0,01$). The reduction in IOP 24 months after surgery was 32.6%. In the second group IOP before surgery was 27.3 ± 4.7 mmHg, and after 24 months - 18.2 ± 0.8 mmHg ($p < 0,01$). The reduction in IOP 24 months after surgery was 33.3%.

Conclusion: In patients with chronic angle-closure glaucoma and appositional anterior chamber angle block Phaco is an effective operation that leads to the opening of the anterior chamber angle and a significant reduction of IOP. In the case of synechia block of the anterior chamber angle Phaco alone does not lead to the opening of the anterior chamber angle, so in that cases combined operation Phaco and GSL is required.

P3.59
Long-term effectiveness and safety of early lensectomy in patients with pseudoexfoliation

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Purpose: To assess and compare the effectiveness, predictability and safety (in the early and long-term follow-up) of cataract surgery with intraocular lens (IOL) implantation in patients presenting advanced pseudoexfoliation (PEX) (symmetric stage) and mild PEX (asymmetric presentation).

Methods: Retrospective single-center study that included PEX patients who underwent phacoemulsification in both eyes. A postoperative follow-up ≥5 years, ≥3 preoperative reliable visual field (VF) tests and VF tests until the analysis visit were required. One hundred sixty-one patients (322 eyes) were included (age: 71.4 ± 5.7 years), and they were classified as "symmetric PEX" (both eyes had PEX; 204 eyes of 102 patients), and "asymmetric PEX" (only one eye presented clinically apparent PEX; 118 eyes of 59 patients). Preoperative and postoperative visual acuity, IOP, number of hypotensive medictaions, and VF mean deviation (MD) were registered, as well as the appearance of intraoperative and postoperative complications. Wilcoxon test was used for statistical analysis.

Results: The mean follow-up time was 8.5 ± 2.8 years. A hydrophobic acrylic IOL was implanted in all the cases. Six months after cataract surgery, 95% and 96% of eyes were within ± 1.00D in symmetric and asymmetric groups, respectively. At the final follow-up, IOP decreased only in the asymmetric group ($p = 0.004$), with a reduction in the number of medications in both ($p < 0.001$). MD changed from -8.8 dB to -11.6 dB in the symmetric group ($p < 0.001$). Intraoperative complications were only registered in the symmetric group: 7 (3.4%; $p = 0.04$). Ten cases (4.9%) of late IOL dislocation were found, all from the symmetric group ($p = 0.03$).

Conclusion: Early lensectomy in patients with PEX before its symmetric presentation resulted effective, safe and predictable in the long term. In addition, a lower rate of glaucoma progression and a better control of IOP were found when surgery was performed in the initial stages of the disease.

P3.60
Micropulse transscleral cyclophotocoagulation (MP-TSCPC) in patients with glaucoma and ocular cicatricial pemphigoid

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Purpose: To review the safety and efficacy of micropulse transscleral cyclophotocoagulation (MP-TSCPC) in patients with glaucoma and ocular cicatricial pemphigoid (OCP).

Methods: A non-comparative retrospective case-series study was performed, including patients with a confirmed diagnosis of OCP, treated with MP-TSCPC between January 2018 to 2020, with a minimum follow-up of 2 years, in a private clinic from Argentina. Intraocular pressure (IOP) and the number of IOP lowering medications were evaluated. The grade of OCP was also considered at baseline and two years after MP-TSCPC.

Results: A total of 10 eyes from 5 patients (1 woman/4 men) with a mean age of 75 ± 6.3 years (66-83) were included. The grade of OCP remained stable 2 years after treatment (grade 2: 3 patients; grade 3: 2 patients); all of them were under systemic immunomodulation. Baseline, mean IOP was 17.9 ± 4.8 mmHg (13-28) and, 24 months decreased to 13.4 ± 1.5 mmHg (10-16). IOP reduction was 25.1% (p: 0.002). The baseline number of anti-glaucomatous drugs was 3.2 ± 0.7 (2-4). It was decreased to 0.6 ± 0.8 (0-2), 2 years after treatment ($p < 0.001$).

Conclusion: MP-TSCPC is a good choice for treating OCP patients with glaucoma, decreasing their IOP as well as the number of topical drops used. Potentially, this is an advantage for patients with ocular surface diseases, which must be confirmed.

P3.61
PreserFlo MicroShunt for secondary glaucoma in patients with hereditary transthyretin amyloidosis: initial results

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Purpose: To assess the safety and effectiveness of PreserFlo MicroShunt in secondary glaucoma caused by hereditary transthyretin amyloidosis (h-TTRA).

Methods: Retrospective case series of h-TTRA patients with uncontrolled amyloid glaucoma followed at the French Reference Center for h-TTRA, who received a PreserFlo MicroShunt with mitomycin (MMC). The primary outcome was complete success at 6 months, defined by postoperative intraocular pressure (IOP) ≤ 18 mmHg without treatment, reduction in IOP ≥ 20% and no further filtering surgery. Secondary outcomes were complete success at 12 months, qualified success (with IOP lowering treatments) at 6 and 12 months, IOP, and number of hypotensive medications. Needlings, bleb revisions and post-operative complications were also collected.

Results: Seven eyes from 7 Val30Met (the most common TTR amyloidogenic mutation) h-TTRA patients were included between October 2020 and November 2021. Preoperative IOP was 27.6 ± 3.3 mmHg with 2.8 ± 1.1 hypotensive medications. Three eyes had a previous subconjunctival filtering surgery, and 2 eyes had received 3 previous procedures. Complete success at 6 months was obtained in all patients with a follow-up of 6 months (5/7), with a mean IOP of 8.0 ± 1.2 mmHg. Complete success at 12 months was obtained for the 2 patients who reached 12 months follow-up. Short term postoperative complications (hyphema, bleb leakage) occurred in 4/7 patients and resolved spontaneously. Bleb fibrosis with IOP elevation occurred in a single patient and required needling and bleb revision at M6.

Conclusion: Secondary amyloid glaucoma is often refractory to medical and conventional surgical treatments. While tube surgery is recommended by expert teams in this setting, PreserFlo MicroShunt with MMC could be an efficient and less invasive option. Further follow-up and more cases are warranted.

P3.62
PreserFlo MicroShunt® implanted in a patient with a bilateral scleromalacia perforans

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Purpose: A 44-year-old male with severe glaucoma in his only eye was sent to our glaucoma department after referring vision loss for more than a year. He had a medical history of recent diagnosis of sarcoidosis and ptisis bulbi in his right eye due to unaffiliated scleromalacia perforans in childhood.

Methods: Ophthalmic exam showed visual acuity of no light perception in his right eye (RE) and 0.5 with Snellen chart in his left eye (LE). It was observed a ptisis bulbi in his RE with scleromalacia perforans and white cataract. In his LE we observed scleral thinning 360º with normal cornea and clear lens. Dilated fundus exam of the LE revealed a pallid optic nerve and a cup-to-disc ratio of 0.95 with normal macula and peripheral retina. The intraocular pressure (IOP) was 30 mmHg with fixed combination of bimatoprost/timolol. We decided to perform an ab-external microshunt implantation with sub-Tenon's anesthesia.

Results: Surgery was performed without complications. The patient was controlled at 24 hours, 1 week, 2 weeks, 4 weeks and 3 months after the surgery. The microshunt was in a correct position with diffuse bleb in every control and a wide anterior chamber. Intraocular pressure in the final visit was 12 mmHg and his is visual acuity was maintained.

Conclusion: In patients with scleral thinning, it can be interesting to perform a surgery avoiding scleral manipulation. The PreserFlo MicroShunt® drains aqueous into the subconjunctival and sub-Tenon's space minimizing the risk of postoperative hypotony and flap related complications. Its demonstrated efficacy and safety outcomes make it useful in cases of one-eyed patients and scleral diseases.

P3.63
From one tube to another. Exchanging an Ahmed valve for a Baerveldt shunt in a secondary glaucoma

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Purpose: To present a case of tube exchange due to uncontrolled IOP.

Methods: A 38 yo male with history of childhood trauma OS, AC-IOL, scleral buckle and PPV with silicone due to giant tear OS in July 2019, was referred to our department with uncontrolled IOP OS (50 mmHg). An Ahmed valve was urgently implanted. While initially IOP was well controlled, 15 months after the implantation and following the removal of the silicon oil by the VR surgeon, IOP increased to 30 mmHg with meds. Needling and flush were performed but all attempts failed to control IOP. The exchange to a Baerveldt shunt was decided. Opening the conjunctiva ~3mm from limbus, we located the Ahmed plate, carefully separated and removed the overlying Tenon's. After ligating the tube, we cut the distal end and removed the plate. We inserted the Baerveldt plate behind the buckle, after ligating the tube with a 3-0 prolene suture. After measuring and cutting the Baerveldt's tube, we carefully extracted the remaining Ahmed tube and positioned the Baerveldt's tube in the A/C through the initial opening. The tube was covered with a scleral graft.

Results: No intraoperative or postoperative complications occurred. On postoperative day one, the tube was well positioned in the A/C, without leaks and IOP was 10 mmHg. 6 months after the implantation, and following the removal of the ligating suture at 3 months, IOP was 16 mmHg and was sustained throughout the 13month follow-up.

Conclusion: In the setting of uncontrolled IOP in a vitrectomized eye with silicon oil and scleral buckle, a failed Ahmed valve can be exchanged with a Baerveldt shunt placed according to the buckle position and size, on or, preferably, behind the buckle.

P3.64
on-penetrating deep sclerectomy with Nd:YAG laser goniopuncture versus trabeculectomy in patients with secondary glaucoma after silicone oil removal

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Purpose: To evaluate the safety and efficacy of non-penetrating deep sclerectomy with Nd:YAG laser goniopuncture versus trabeculectomy in patients with secondary glaucoma after silicone oil removal.

Methods: This was a retrospective clinical study that included 43 eyes of 43 patients with secondary glaucoma after silicone oil removal. First group included 22 eyes that have underwent non-penetrating deep sclerectomy with Nd:YAG laser goniopuncture 1 month later. Second group included 21 eyes that have underwent penetrating trabeculectomy. All patients underwent silicone oil removal 90 ± 13 days before and have uncontrolled intraocular pressure (IOP). Patients were examined 1 day, 1 week, 2 weeks, 1 month, 6 months and 1 year after surgery. The main outcome measures were intraocular pressure, number of additional hypotensive medications, and postoperative complications.

Results: The mean preoperative IOP was 25.9 ± 7.1 mmHg in both groups using combination of 3 hypotensive medications. Postoperative complications were: at first group – hypotony (1 case, 4,5%), choroidal detachment (1 case, 4.5%); at second group - hypotony (3 cases, 14.3%), hyphaema (2 cases, 9.5%), choroidal detachment (3 cases, 14.3%), intraocular hemorrhage (1 case, 4.8%). At the end of the follow-up period, the mean IOP was 14.3 ± 3.7 mmHg at first group and 13.9 ± 4.2 mmHg at the second group. 4 patients (18,2%) of the first group and 5 patients (23,8%) of the second group required additional hypotensive medications at the end of the follow-up period.

Conclusion: Both non-penetrating deep sclerectomy with Nd:YAG laser goniopuncture and trabeculectomy are effective in treatment of secondary glaucoma after silicone oil removal. Non-penetrating deep sclerectomy has fewer postoperative complications in comparison to trabeculectomy.

P3.65
Prompt primary cyclophotocoagulation with subsequent aqueous shunt as needed for neovascular glaucoma with synechial angle closure

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Purpose: In acute NVG, implanting an aqueous shunt into eyes with active anterior segment neovascularization (NV) increases bleeding-related complications. Prompt anti-VEGF rapidly regresses NV but is ineffective at lowering IOP when the angle is already synechially closed. CPC has historically been reserved for eyes with poor visual potential. The purpose of this case series is to describe a single surgeon's experience utilizing prompt CPC with prior or concurrent anti-VEGF and subsequent aqueous shunt as needed in NVG eyes with synechial angle closure, regardless of visual potential.

Methods: A retrospective chart review was performed for NVG patients with uncontrolled IOP, active anterior segment NV, a synechially closed angle, no contraindications to prompt anti-VEGF, CPC within 3 days of presentation, and at least 6 months of follow-up.

Results: Seven patients (3 male, 4 female, all African-American) with mean age 63.9 years were included. Underlying etiologies were PDR (N = 3), CRVO (N = 3), and chronic RD (N = 1). All patients received prompt intravitreal anti-VEGF on the day of presentation or within 3 days with CPC. Patients received ongoing anti-VEGF injections and PRP with the retina service. Five patients did not require subsequent tubes through a mean follow-up of 14.8 months; most recent visual acuities ranged from 20/50 to LP, and IOPs ranged from 4-20 mmHg on 0-3 IOP-lowering medications. Two patients who required subsequent tubes (1 Ahmed 5weeks later, 1 Baerveldt-350 11weeks later) had resolution of active anterior segment NV by the time of surgery, and phaco could be performed to facilitate sulcus tube placement. At most recent follow-up (26 and 7 months), visual acuities were 20/40 and 20/150 with normal IOP. No eyes developed uncontrolled anterior segment inflammation, macular edema, or phthisis.

Conclusion: Prompt primary CPC within 3 days, with prior or concurrent anti-VEGF, is an effective strategy to immediately lower IOP in acute NVG eyes with active anterior segment NV and synechially closed angles, regardless of visual potential. If IOP becomes uncontrolled later, an aqueous shunt can be implanted in a controlled setting after NV has regressed. Further research is needed to compare outcomes of prompt CPC vs aqueous shunt in acute NVG eyes with synechially closed angles.

P3.66
Clinical outcomes of Ahmed glaucoma valve implantation in secondary glaucomas at Hospital Pedro Hispano

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Purpose: The Ahmed glaucoma valve (AGV; New World Medical Inc) is a surgical device that shunts the aqueous humor (AH) to the posterior subconjunctival space, decreasing intraocular pressure (IOP). Indications include eyes with secondary glaucoma (neovascular, inflammatory, glaucoma in aphakia and pseudophakia) and eyes that have previously failed filtering surgery. Complications include early and late postoperative hypotony, capsule fibrosis, erosion of the tube or plate edge and infection. The aim of the study is to evaluate the long-term results and complications of AGV implant in Hospital Pedro Hispano (HPH), Portugal.

Methods: Retrospective study of 33 eyes with secondary glaucoma submitted to AGV implantation, with a minimum follow-up period of one year. IOP was measurement before and at one day, one week, one, three, six, nine, twelve, eighteen and twenty-four months (1-24m) after surgery. Complications and the number of anti-glaucoma medications were recorded. Surgical success was defined as IOP between 5 and 21 mmHg and IOP reduction from baseline ≥20%, and no additional glaucoma surgery. Reintervention was not considered as failure

Results: Mean age was 75.7 ± 11.3 years. The most frequent diagnoses were neovascular (54.5%) and pseudoexfoliative (18.2%) glaucomas. 54.5% of cases were submitted to AGV implantation alone, whilst in 33.3% and 12.1% were combined

with posterior vitrectomy and cataract surgery, respectively. IOP was reduced from a mean of 35.4 ± 8.3 to 15.8 ± 6.4 mmHg (55.4% reduction) at 12m, 16.6 ± 7.6 mmHg (53.1% reduction) at 24m, and at last follow up visit to 15.1 ± 4.6 mmHg (57.5% reduction). The mean number of glaucoma medications was reduced from 3.5 ± 1.2 to 1.7 ± 1.5. Surgical success was achieved in 96.9% at 1 year and in 90.9% at the end of follow-up. The most common complications were conjunctival suture dehiscence in 24.2%, with tube exposure in 21.2% and choroidal detachment in 18.2%. Reintervention was needed in 30.3% and the AVG was removed in 18.1% cases.

Conclusion: In this study, conjunctival dehiscence with tube exposure was the most common complication, which implied a new surgical intervention. Nevertheless, AGV seems to be effective and relatively safe procedure in treating secondary glaucomas and effective management of complications permits to improve the rate of success.

P3.67
The management of uveitic glaucoma with PAUL® glaucoma implant

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Purpose: To report treatment outcomes in uveitic glaucoma patients managed with a novel glaucoma drainage device from a single tertiary referral centre in Manchester Royal Eye Hospital.

Methods: A consecutive retrospective study including patients with secondary glaucoma following uveitis who underwent PAUL® Glaucoma Implant between April 2019 and August 2021 with a median follow-up of 10 months. Preoperative and postoperative intraocular pressure (IOP) and number of medications at each follow-up were recorded. Complete success was defined by reduction of more than 20% in intraocular pressure and IOP < 18 mmHg at last follow-up whilst qualified success was defined as IOP ≤ 18 mmHg regardless of topical medication. A reduction of less than 20% and IOP > 18 mmHg at last follow-up from listing measure was considered failure. Clinical hypotony was defined by an IOP ≤ 5 mmHg and the number of surgical re-interventions were also recorded.

Results: In total, 46 eyes of 40 patients were included in the study with 6 patients having had bilateral PAUL® Glaucoma Implant. The mean age ± standard deviation was 46.9 ± 19.4 with a diagnosis of uveitic glaucoma. The mean preoperative listing IOP and number of medications in this group was 30.2 ± 9.1 mmHg with an average of 3.7 ± 0.9 topical glaucoma drops. The postoperative IOP achieved at last follow-up was 12 ± 3.4 mmHg. 43 eyes (93.4%) have met the complete success criteria. Qualified success was obtained in 45 eyes (97.8%) with an IOP ≤18 mmHg with or without topical medication. The average of total reduction in IOP was 57.7% ± 14.8 at last follow-up. There were 4 cases of clinical hypotony, 3 resolved spontaneously while 1 required re-suturing of paracentesis (non-device related).

Conclusion: PAUL® Glaucoma Implant, a novel non-valved glaucoma drainage device has achieved a significantly high reduction in IOP in this group which has included only uveitic glaucoma patients with our surgical technique. Majority of patients remained on no topical glaucoma agents at their last follow-up.

P3.68
Feasibility, efficacy and safety of early lens extraction in patients with pseudoexfoliation glaucoma: a feasibility and pilot study

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Purpose: To evaluate the feasibility of a trial to compare the efficacy and safety of initial lens extraction surgery versus medical treatment for people with newly diagnosed pseudoexfoliation glaucoma (PXFG).

Methods: A prospective, randomized feasibility and pilot trial was conducted from May 2019 to February 2021. Patients with newly diagnosed PXFG and mild cataract were recruited and randomized into either early lens extraction surgery or medical treatment and deferred surgery. Primary outcome was intraocular pressure (IOP) at 12 months and secondary outcome measures included: best corrected visual acuity (BCVA), visual field test index (VFI), optical coherence tomography (OCT) parameters, quality of life measured by the National Eye Institute visual function questionnaire (NEI –VFQ 39), endothelial cell count, number of antiglaucoma medications, postoperative complications and recruitment rate. An online questionnaire survey was conducted among members of UK and Eire Glaucoma Society (UKEGS) and Spanish Glaucoma Society (SEG) with the aim of understanding current practices related to interventions for PXFG, the role of phacoemulsification, and the willingness to participate in a definite trial.

Results: Twelve patients were randomized, six in each group. Median IOP decreased significantly in both arms and no statistically significant difference was found between groups. Among the secondary outcomes of BVCA, reduction in the number of treatments and quality of life, statistically significant differences were found in favor of lens extraction. There were no differences in other secondary outcomes. No adverse effects occurred. 93% of glaucoma experts interviewed in the online survey answered that phaco improves IOP control. Most respondents (85%) change the timing for cataract surgery and offer it earlier in people with PXFG and 99% would be willing to change their practices if there is evidence of efficacy and feasibility in favor of early lens extraction.

Conclusion: In this pilot study early lens extraction surgery was an effective treatment for PXFG, reducing the number of hypotensive drugs after surgery as well as improving patients' quality of life. Glaucoma professionals offer early phacoemulsification in PXFG. Results of a definitive RCT will be needed to confirm our findings.

P3.69
Methods for treatment of secondary uncompensated glaucoma

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Secondary neovascular glaucoma refers to refractory forms, characterized by low treatment efficiency, unpredictability of long-term results and a high percentage of complications.

Purpose: The purpose of this study was to evaluate the effectiveness of the treatment of secondary uncompensated glaucoma.

Methods: 23 patients (23 eyes) with secondary neovascular glaucoma were operated on. The average IOP (Po) was 32 ± 1.5 mmHg at the maximum hypotensive regimen. Gonioscopy: anterior chamber angle is closed, multiple newly formed vessels. The patients were divided into two groups: the 1st group of 11 patients (49%) underwent transciliary drainage of the posterior chamber and the 2nd group 12 patients (51%) were operated on by the proposed method, the particularity of which is the formation of 5 holes under the superficial scleral flap in a checkerboard pattern, one of which is made through with an 810 nm diode laser until fluid appears from the posterior chamber. 2 lower ones are formed, leaving a cap (valve) on the leg. The valve is folded inward by ½ of its size between the sclera and choroid to increase uveoscleral outflow. The observation period is 1 year.

Results: All operations were performed without complications. The average IOP in the 1st group was 12 ± 0.7 mmHg, in the 2nd group 9 ± 1.2 mmHg. without antihypertensive therapy. IOP in the second group was lower than in the first and was respectively 12 ± 0.6 mmHg and 15 ± 0.8 mmHg. Visual acuity remained stable throughout the observation period. 4 patients (36%) of the 1st group and 2 (17%) of the 2nd group needed to add monotherapy within 6-8 months due to the negative dynamics in the state of the ONH.

Conclusion: The combined method of treatment by formation of additional holes makes it possible to maintain the volume of the intrascleral cavity for a longer period of time and prevent excessive scarring in the surgically formed outflow tracts. This in turn contributes to the prolongation of the hypotensive effect and preservation of visual functions.

P3.70
Changes in anterior segment parameters after phacoemulsification in patients with pseudoexfoliation glaucoma versus patients with primary open-angle glaucoma and normal subjects

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Purpose: To compare the changes in intraocular pressure (IOP) and anterior segment (AS) parameters induced by uneventful phacoemulsification in eyes with pseudoexfoliation glaucoma (PXG), primary open-angle glaucoma (POAG) and normal eyes.

Methods: One hundred-six eyes of 106 patients with age-related cataract were enrolled in this prospective comparative study. The patients were divided into age and sex-matched groups as PXG (n = 37), POAG (n = 34), and control group (n = 35). Anterior chamber depth (ACD), anterior chamber volume (ACV), anterior chamber angle (ACA), lens thickness (LT), central corneal thickness (CCT), and corneal volume (CV) measurements were obtained by AS Scheimpflug tomography preoperatively and at 1-month follow-up. Visual acuity, intraocular pressure (IOP), AL and AS parameters were compared between groups. Correlation analysis was performed to evaluate the factors related to IOP change following cataract surgery.

Results: Before cataract surgery, ACD and ACV were significantly smaller, and LT was greater in the PXG group than POAG group ($p = 0.002$, $p = 0.01$ and $p = 0.03$ respectively). None of the preoperative parameters differed between PXG and normal eyes, and also between POAG and normal eyes ($p > 0.05$). At postoperative first month, reduction in IOP was significantly higher in the PXG group, compared to POAG ($p = 0.03$) and normal group ($p = 0.01$). The deepening of ACD was significantly lower in the POAG than PXG ($p = 0.009$) and normal eyes ($p = 0.07$). The change in ACA was significantly higher in eyes with PXG than those with POAG ($p = 0.02$). There was no statistically significant difference in ACD, ACV and ACA changes between PXG and normal eyes. Increasing of CCT was higher in PXG than POAG ($p = 0.01$) and normal eyes ($p = 0.005$). The reduction in IOP was significantly associated with only preoperative IOP in the PXG ($p = 0.001$) and POAG groups ($p = 0.01$). There was significantly negative correlation between IOP change and preoperative IOP ($p = 0.04$) and LT ($p = 0.04$) in the normal eyes.

Conclusion: Reduction in IOP and increase in CCT was higher in PXG group among three groups. Deepening in ACD and ACA was greater in PXG than POAG. Reduction in IOP was associated with higher preoperative IOP in all groups, and also with higher LT in the normal group.

P3.71
Challenges in combined Ahmed valve and phacoemulsification with intraocular lens implantation in secondary glaucoma

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Purpose: Is to emphasize the surgical challenges plus the outcome of combined Ahmed glaucoma valve (AGV) and phacoemulsification with posterior chamber intraocular lens implantation in a patient with secondary glaucoma related to retinopathy of prematurity (ROP) and HIV infection.

Methods: Male patient age 33, with a positive history for bilateral ROP, congenital nystagmus and HIV infection at birth. In the single functional eye, OD, best corrected visual acuity (BCVA) at baseline was hand motion and the intraocular pressure (IOP) was 50 mmHg under maximal medication. The intumescent cataract with signs of anterior uveitis prevented direct visualization of the fundus in OD, yet the ultrasound examination (mod A&B) revealed the presence of fine tractional structures across the vitreous cavity, without retinal detachment. The fellow eye OS, had no light perception, due to old total retinal detachment in ROP context.

Results: During a complex surgical procedure, a single-piece IOL (23D, AcrySof IQ SN60WF, Alcon) was implanted in the first step, then a valvulated artificial drainage system (AGV) was inserted in the ciliary sulcus with favorable outcome. The IOP stabilized after the hypertensive phase of the AGV at 10 mmHg (Cosopt). Post-op fundus examination in OD that revealed large areas of atrophic retina adjacent to the optic nerve extending towards the macula and the infero-temporal quadrant, suggestive for a previous retino-choroiditis infection (possible opportunistic posterior uveitis, HIV related).

Conclusion: Despite a correct surgery and optimal IOP control in this case, the results need to be interpreted realistically, according to the anatomical and functional particularities of the operated eye.

P3.72
Glaucoma surgery in secondary uveitic glaucoma in children with juvenile idiopathic arthritis

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Purpose: Uveitic glaucoma is a common complication of uveitis. Medical therapy is used first and only cases refractory to medical treatment are further referred to surgery. Surgery in time of uveal activity is not recommended because of high failure rate. Intensive perioperative systemic and local treatment is often mandatory. The purpose of our study was to evaluate outcomes of glaucoma surgery in secondary uveitic glaucoma in children with juvenile idiopathic arthritis (JIA).

Methods: Retrospective review of surgery results of pediatric patients with bilateral JIA associated uveitis and secondary uveitic glaucoma refractory to medical treatment at the Glaucoma center of our department from 2018-2022.

Results: In our group (3 patients / 6 eyes) JIA diagnosis was made at the age between age 2 to 6 years, median 3 years. All patients were at some point treated with systemic corticosteroids, however for most of the time biological therapy (adalimumab) and other immunosuppressants were used to treat primary disease. Uveitis in all 6 eyes required topical steroid application. Secondary glaucoma occurred in all eyes no later than two years after first ocular manifestation of uveitis, median 16 months. Surgery was needed in all 6 eyes, mean IOP before surgery was 32.3 mmHg. Performed surgeries were – trabeculectomy with collagen implant (2 eyes), trabeculectomy with collagen implant and mitomycin C (1 eye), antiglaucoma drainage implant with mitomycin C (3 eyes). Mean postoperative pressure was 14.8 mmHg. IOP is controlled in 4 eyes without antiglaucoma therapy (complete success). 2 eyes require IOP-lowering medication (qualified success). 2 eyes of 1 patient required repeated surgery and additional laser treatment - transscleral cyclophotocoagulation.

Conclusion: In our experience trabeculectomy and drainage implants combined with antimetabolites are most effective treatment of refractory secondary glaucoma in children with JIA-associated uveitis. 3 of 4 eyes with complete success of surgery underwent either trabeculectomy or glaucoma drainage implant with mitomycin C and did not require any additional intervention. Good perioperative control of uveitis is crucial for the success of surgery.

P3.74
Combined Ahmed valve/gonioscopy-assisted transluminal trabeculotomy: a novel surgical technique for advanced open angle glaucoma

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Purpose: To describe the protocol and outcomes of a novel combined surgical method for intraocular pressure (IOP) lowering in advanced glaucoma

Methods: A retrospective review of ten eyes of eight patients submitted to combined Ahmed valve/gonioscopy assisted transluminal trabeculotomy (GATT) surgery at the hands of one glaucoma surgeon was performed. All patients presented with advanced primary open angle glaucoma refractory to topical polytherapy. Subjects underwent both the placement of a FP7 Ahmed device and a hemi-GATT in a single surgical session, were started on a standard postoperative regimen of Tobradex, and followed up at postoperative day 1, 2, week 1, 2, 4, and monthly thereafter. Here, we report data from the first year of followup. Primary outcomes included postoperative IOP reduction compared to preoperative baseline, number of ocular hypotensives required to achieve target IOP, maximum postoperative pressure (spike), and postoperative complication/failure rate.

Results: Participants had a mean age of 70.9 ± 2.6 yrs, and the study group was 30% female. The combined Ahmed-GATT procedure was effective in lowering intraocular pressure, with a mean IOP reduction of 7.6 ± 1.8 mmHg (19.6 ± 1.1 mmHg preoperatively, 12.0 ± 1.1mmHg at last followup, $p < 0.001$). One patient had early postoperative hypotony requiring anterior chamber reformation; no other complications occurred in the study group. The number of hypotensive agents required to achieve target IOP significantly decreased following combined Ahmed-GATT (3.8 ± 0.3 agents preoperatively; 2.2 ± 0.6 agents at last followup, $p < 0.05$). Highest IOP was at postoperative week 3 (15.4 ± 1.6 mmHg). Only two patients experienced IOPs over 20mmHg at any point during the postoperative period; both were readily controlled with topical hypotensives.

Conclusion: The Ahmed valve and GATT are effective, widely-employed procedures for IOP-lowering. However, they have limitations, including lesser absolute IOP reduction compared to trabeculectomy and (in the case of GATT), the risk of postoperative pressure spike secondary to hemorrhage. Our novel combined-methods approach leverages the benefit of each modality, pairing an angle based surgery with a subconjunctival filtering procedure. These findings suggest this 'double bypass' strategy can provide a safe, effective mechanism for IOP reduction that largely circumvents the risk of postoperative pressure spikes whilst achieving an outcome IOP lower than either method alone.

Poster Session 4

Treatment - Surgery/Laser

P4.01 OCT-A analysis of filtration bleb vascularization after Santen PreserFlo Microshunt implantation
Martin Kallab, Sophie Beka, Anna Reisinger, Matthias Bolz, Clemens Strohmaier *(Austria)*

P4.02 Non-penetrating deep sclerectomy versus standalone XEN gel stent: a retrospective comparative study
Arnaud Touboul, Yves Lachkar *(France)*

P4.03 Long-term outcomes of micropulse transscleral cyclophotocoagulation in a tertiary hospital
Júlio Almeida, Maria Teixeira Dias, Catarina Monteiro, Rita Basto, Ana Sofia Lopes, Fernando Vaz, Isabel Prieto *(Portugal)*

P4.04 Trabeculectomy surgical skill training program aimed at 3rd year residents and fellows, performed at Hospital Italiano de Buenos Aires, on animal eye models
Arturo Burchakchi, Agustina de Gainza, Franco Hernandez *(Argentina)*

P4.05 The Moorfields safer surgery system trabeculectomy surgical outcomes: a 10-year retrospective study
Catarina Monteiro, Júlio Almeida, Joana Roque, Mário Ramalho, Ana Sofia Lopes, Fernando Vaz, Isabel Prieto *(Portugal)*

P4.06 Postoperative assessment following iStent Inject W implant with NIDEK GS-1 automated gonioscopy
Irena Serov-Volach, Bhagyashree Joshi, Aby Jacob, Francesco Stringa *(United Kingdom)*

P4.07 Smart app to predict best personalized minimally invasive glaucoma treatment (iMIGS)
Umair Qidwai, Uvais Qidwai, Gokulan Ratnarajan *(Qatar)*

P4.08 The effect of different post-selective laser trabeculoplasty treatment modalities on intra-ocular pressure reduction
Ahmed Wanas, Max Davidson, Simon Ruben *(United Kingdom)*

P4.09 A retrospective review of PreserFlo MicroShunt surgery at a single surgical centre in England
Symeon Nicolaou, Chrysostomos Dimitriou, Achyut Mukherjee, Mahmoud Radwan, Georgios Chatzithanasis, Mohamed Elghobaier, Yunfei Yang, Asad Zaheer *(United Kingdom)*

P4.10 Intermediate-term outcomes of combined phacoemulsification with ab interno excisional goniotomy with the Kahook Dual Blade
Theodoros Filippopoulos[1], Dimitrios Tsoukanas[1], Sotiria Palioura[2], Dimitra Kopsini[1], Gerasimos Kopsinis[1]
([1]Greece, [2]USA)

P4.11 Selective laser trabeculoplasty (SLT) as an adjunct therapy in advanced pseudoexfoliative glaucoma and advanced primary open angle glaucoma
Inbar Gur, Eran Berkowitz, Maroun Khreish, Islam Al-Hashash, Avi Schwalb, Inbar Waizer, Beatrice Tiosano *(Israel)*

P4.12 Goniotomy with Kahook Dual Blade in medically uncontrolled glaucoma
Anna Barkander, Gauti Jóhannesson, Mario Economou *(Sweden)*

P4.13 Short term safety and efficacy of the PreserFlo MicroShunt in high risk glaucoma patients who have undergone conjunctival scarring procedures including: trabeculectomy, tube surgery and diodes
Ishani Barai, Ahmed Al-Nahrawy, Sally Ameen, Faisal Ahmed *(United Kingdom)*

P4.14 Efficacy and safety of combined 27-G vitrectomy and Ahmed valve using same sclerotomy site for the tube placement: a case series
Francesc Franquesa Garcia, Nestor Ventura Abreu, Joan Giralt, Anna Sala-Puigdollers, Marta Pazos *(Spain)*

P4.15 Two-year safety and efficacy results of a supraciliary drainage device in patients with open angle glaucoma - a meta-analysis from STAR-I, STAR-II and STAR-III trials
Antonio Maria Fea *(Italy)*

P4.16 Descemet membrane detachment after non-penetrating deep sclerectomy associated to increased pressure in the scleral lake
Laia Jaumandreu, Laura Diez Alvarez, Cristina Ye Ye Zhu, Gema Rebolleda Fernández, Francisco José Muñoz Negrete *(Spain)*

P4.17 Transient ciliochoroidal detachment after microhook ab interno trabeculotomy
Kazuyuki Hirooka, Fumiya Miyako, Hiromitsu Onoe, Naoko Okada, Hideaki Okumichi, Yoshiaki Kiuchi *(Japan)*

P4.18 Ultrasound cycloplasty using high-intensity focused ultrasound in open angle glaucoma myopic patients
Michele Figus, Alessandro Palma, Giuseppe Covello, Chiara Posarelli *(Pisa)*

P4.19 Five-year results with the PreserFlo™ MicroShunt for surgical treatment of glaucoma
Stefani Kujovic, Lotte M.J. Scheres, Ronald de Crom, Carroll Webers, Henny Beckers *(The Netherlands)*

P4.20 Expert consensus on the use of the PreserFlo™ MicroShunt device in the treatment of glaucoma: a modified Delphi Panel
Anthony Khawaja[1], Ingeborg Stalmans[2], Florent Aptel[3], Keith Barton[1], Henny Beckers[4], Thomas Klink[5], Giorgio Marchini[6], Jose Martinez-de-la-Casa[6], Jan Henrik Simonsen[7], Marc Toeteberg-Harms[8,9], Clemens Vass[10], Luis Abegão Pinto[11] *([1]United Kingdom, [2]Belgium, [3]France, [4]The Netherlands, [5]Germany, [6]Spain, [7]Denmark, [8]Switzerland, [9]USA, [10]Austria, [11]Portugal)*

P4.21 GLAUrious, a multicentre, randomised, controlled non-inferiority study of direct selective laser trabeculoplasty in open angle glaucoma
Gus Gazzard, GLAUrious Study Group *(United Kingdom)*

P4.22 Combined excimer laser trabeculostomy and phacoemulsification: a multicenter real-word data study
Antonio Moreno Valladares, Ester Roquet, Maribel Canut, Eva Gonzalez Aquino, Nieves Puerto Amorós, Francisca Gonzalez López, Teresa Prieto Moran, Marta Mármol, Federico Trejos, Francisco Ruiz Tolosa, Mónica Martínez Díaz *(Spain)*

P4.23 Antimicrobial activity of topical ophthalmic anesthetics and topical ophthalmic antiseptics against microorganisms, received from the patients prior glaucoma filtrating surgery
Halyna Nazarchuk, Oleksandr Nazarchuk, Uliana Babina *(Ukraine)*

P4.24 Postoperative pain after different transscleral laser cyclophotocoagulation procedures
Thomas Falb, Lukas Hoeflechner, Astrid Heidinger, Fabian Wallisch, Hrvoje Tomašic, Domagoj Ivastinovic, Ewald Lindner *(Austria)*

P4.25 Sutureless deep sclerectomy with fibrin sealant (Tisseel) - preliminary outcomes
Alina-Dana Baxant, Lucie Holubova, Patrik Pluhovsky, Pavel Studeny *(Czech Republic)*

P4.26 The eyePlate-300 implant: results in refractory glaucoma
Syed Ahmed, Simrun Virdee, Ahmed Al-Nahrawy, Ahmed Mazrouaa, Faisal Ahmed *(United Kingdom)*

P4.27 Analysis of a series of patients who underwent PAUL glaucoma implant surgery and removal of the tutor before the third postoperative month
Elena Milla, Francesc Franquesa Garcia, Jordi Izquierdo Serra, Valeria Constanza Opazo Toro *(Spain)*

P4.28 Usefulness of guided implantation of Ahmed glaucoma valve
Chang Kyu Lee, Ji Hyoung Chey (South Korea)

P4.29 Real world efficacy and safety of XEN45 secondary bleb needling
Mordechai Goldberg[1,2], Eran Berkowitz[1,2], Simon Ruben[1] *([1]United Kingdom, [2]Israel)*

P4.30 Evaluation of selective laser trabeculoplasty effectiveness in patients with ocular hypertension and open-angle glaucoma
Dmytro Martynov, Ostap Horobiuk, Vitalina Horobiuk, Oleh Horobiuk *(Ukraine)*

P4.31 The management of neovascular glaucoma: a systematic review and meta analysis of randomised controlled trials
Saajan Ramji, Gurnoor Nagi, Abdus Samad Ansari, Obeda Kailani *(United Kingdom)*

P4.32 Micropulse trans-scleral cyclophotocoagulation (MPTCP) versus continuous wave trans-scleral cyclophotocoagulation (TCP) in eyes with glaucoma - the Diode in Glaucoma Study (DIGS)
Jayant Venkatramani Iyer, Xianhui Lim, Olivia Shimin Huang, Tina Tzee Ling Wong *(Singapore)*

P4.33 Impact of PreserFlo® MicroShunt on the corneal endothelial cells
Caroline Gassel, Karl Ulrich Bartz-Schmidt, Bogomil Voykov *(Germany)*

P4.34 Reoperations for complications after gel stent implantation or trabeculectomy
Carlo Alberto Cutolo, Michele Iester, Ilaria Di Mola, Carlo Catti, Chiara Pizzorno, Chiara Bonzano, Alessandro Bagnis, Carlo Traverso *(Genoa)*

P4.35 Efficacy and safety of application of MMC 0.4 mg/mL for 5 minutes with PreserFlo MicroShunt
Eamonn Fahy, Anurag Garg, Sheng Lim *(United Kingdom)*

P4.36 Differences in outcomes of ab externo trabeculectomy performed by residents versus assistants
Mário Lima-Fontes[1], Ana Faria-Pereira[1], Mariana Leuzinger Dias[1], Marta Silva[1], João Barbosa Breda[1,2], Joana Rodrigues Araújo[1], Sérgio Silva[1,3], Antonio Melo[1,3], Flávio Alves[1], João Tavares-Ferreira[1] *([1]Portugal, [2]Belgium, [3]Portugal)*

P4.37 Modified technique of Ex-Press filtration device combined with a scleral pocket for severe open angle glaucoma: the experience of a tertiary center
Rita Vieira, Miguel Afonso, Ana Figueiredo, Rita Reis, Isabel Sampaio, Maria João Menéres *(Portugal)*

P4.38 Intraoperative downsizing of the Baerveldt implant plate in elderly patients with short eyes
Juha Välimäki *(Finland)*

P4.39 A simple surgical solution for the treatment of persistent postoperative hypotony after PreserFlo MicroShunt implantation
Soledad Aguilar Munoa, Yih-Horng Tham, Keith Barton *(United Kingdom)*

P4.40 Dilated, atonic pupil after micropulse transscleral laser treatment
Alexander Cunea[1,2], Ahmed Al-Nahrawy[2,3], Nada Mohamed[2], Mahmoud Radwan[2], Faisal Ahmed[2], Laura Crawley[2], Philip Bloom[2] *([1]Germany, [2]United Kingdom, [3]Egypt)*

P4.41 Is trabeculectomy associated with an improvement in circumpapillary RNFL or macular GCIPL thickness?
Tej Malcolm, Andrew Tatham *(United Kingdom)*

P4.42 Ahmed clearpath in refractary glaucoma: 2 year follow up of safety and efficacy
Syril Dorairaj, Leticia Checo, Richard Ten Hulzen, Isabella Wagner, Abhimanyu Ahuja, Aarav Patel *(USA)*

P4.43 PreserFlo as a rescue surgical technique. Results after six months
Jéssica Botella García, Jordi Loscos Arenas, Pau Romera Romero, Adrián Sánchez-Fortún Sánchez, Andres Fernandez-Vega-Cueto *(Spain)*

P4.44 Efficacy and safety of the XEN45 implant at 4 years
Victor Mallén Gracia, Maria Pilar Bambó Rubio, María José Vicente Altabás, Jacobo Yañez Merino, Alvaro Tello, Andrés Biescas *(Spain)*

P4.45 Intraocular pressure control, bleb morphology and adverse effects after trabeculectomy with adjunctive use of Mitomycin - C and bevacizumab
Pir Salim Mahar *(Pakistan)*

P4.46 Systematic review of the method and quality of reporting of complications from studies evaluating innovative glaucoma surgical procedures
Jonathan Bonnar, Augusto Azuara-Blanco *(United Kingdom)*

P4.47 IStent Inject: our results
Valeria Opazo Toro, Maria Jesus Muniesa, Georgina Casanovas, Nestor Ventura Abreu, Elena Milla, Marta Pazos *(Spain)*

P4.48 Hydraulic conductivity of the filtering bleb wall with the PreserFlo MicroShunt: objective mathematical measurement of bleb function
Marta Ibarz Barberá, Jean Bragard, Fatima Martinez Galdon, Jose Luis Hernandez Verdejo, laura Morales Fernández, Pedro Tañá Rivero, Miguel Teus Guezala *(Spain)*

P4.49 Is direct anaesthetic support needed for all Baervelt tube surgery?
Yingjia Yang, James Kirwan *(United Kingdom)*

P4.50 Long term effects of trabeculectomy on visual field progression across two centres in the United Kingdom: a 10 year follow up
Yingjia Yang, Matthew Shah, Hannaa Bobat, Anastasios Sepetis, Peter Shah, James Kirwan *(United Kingdom)*

P4.52 Surgical outcome of Molteno3 in uncontrolled glaucoma
Carlos A. Arciniegas-Perasso, Susana Duch, Osvaldo Guevara-Chavarría *(Spain)*

P4.53 10+ year clinical outcomes of tube shunt surgery on glaucomatous patients
Ryan Lamrani, Jae Chiang Wong, Daniel Lee, Jonathan S. Myers *(USA)*

P4.54 Efficacy and safety of a novel Ahmed valve implantation technique: a 5-year retrospective study
Stefano Gandolfi, Luigi Varano, Nicola Ungaro, Paolo Mora, Viola Tagliavini, Salvatore Tedesco *(Italy)*

P4.55 Trabeculectomy vs non-penetrating deep sclerectomy for the surgical treatment of open-angle glaucoma: a long-term report of 201 eyes
Renato Barbosa, Rita Gonçalves, Ricardo Bastos, Sara Pereira, Rita Basto, Rita Viana, Paula Tenedório *(Portugal)*

P4.56 XEN in the management of early glaucoma surgery: a national Delphi consensus study
Jose Martinez-de-la-Casa, Jose Manuel Larrosa, Rafael Gimenez, Francisco Javier Goñi, Elena Milla, Marta Pazos, Susana Perucho Martinez, J. Aritz Urcola *(Spain)*

P4.57 Trab vs PhacoTrab: is a bird in the hand better than two in the bush?
Francisco Alves, Júlio Brissos, Guilherme Almeida, Miguel Leitão, Catarina Rodrigues, Manuel Marques, Carlos Perpétua, Joana Valadares, Jorge Godinho, José Fernandes, João Segurado *(Portugal)*

P4.58 Micro-pulse cyclophotocoagulation in the treatment of various types of refractory glaucoma
Igor Shiryaev, Marina Pravosudova *(Russian Federation)*

P4.59 The expansion of the criteria for Ahmed glaucoma valve implantation
Evgeniya Oblovatskaya, Vadim Nikolaenko *(Russian Federation)*

P4.60 Preliminary results of a new technique for ab externo implantation of the XEN gel stent performed at the slit lamp (SLX)
Nima Shahi *(Canada)*

P4.61 Serous choroid detachment after glaucoma filtering surgery: series of 23 eyes
Fernando Trejo, Francesc Xavier Garrell, Marta Castany, Jaume Rigo, Antoni Dou *(Spain)*

P4.62 Use of ologen implant in glaucoma filtration surgeries: a six-months follow up
Stefany Montoya Ortega, Cristina Castella Capsir, Manuel Alexander Castro Diaz, Beatriz Torrellas Darvas *(Spain)*

P4.63 Outcomes of eyeWatch valve implantation for refractory glaucoma
Segolene Roemer, André Mermoud *(Switzerland)*

P4.64 Safety profile and efficacy of trabecular micro-bypass system iStent™ experience from a single centre in UK
Bhagyashree Joshi, Suresh Thulasidharan, Francesco Stringa, Richard Imonikhe, Nishani Amerasinghe, Aby Jacob *(United Kingdom)*

P4.65 Study of the efficacy of selective laser trabeculoplasty in ocular hypertension and glaucoma
Alfonso Rubio Reina, Oier Pérez Díaz, Javier Guzmán, Carlos Lázaro García *(Spain)*

P4.66 Short- to medium-term outcomes of Kahook Dual Blade excisional goniotomy with concomitant phacoemulsification: a pan-Canadian study
Ali Salimi, Lautaro Vera, Rob Pintwala, Oscar Kasner, Marc Mydlarski, Steven Schendel, Dima Kalache, Paul Harasymowycz *(Canada)*

P4.67 Efficacy of micropulse laser trabeculoplasty in Asian patients: results at 6-9 months
Michele Pei Wen Leong, Seng Kheong Fang, Eng Hui Gan, Wen Wei (David) Woo *(Malaysia)*

P4.68 Efficacy and outcomes of Nd:YAG laser goniopuncture after nonpenetrating deep sclerectomy
Ana Vale, Rita Gonçalves, Ricardo Bastos, Renato Barbosa, Rita Basto, Paula Tenedório *(Portugal)*

P4.69 Outcomes of filtering surgery with collagen matrix implant (Ologen®) and mitomycin C (MMC) versus MMC alone
Maria Jesus Muniesa, Valeria Opazo Toro, Marta Pazos, Elena Milla, Nestor Ventura Abreu *(Spain)*

P4.71 XEN ab externo and ab interno: comparison of safety and efficacy between both approaches
Yann Bertolani, Marta Castany Aregall, Natalia Anglada, Julia Angrill, Liliana Gutuleac *(Spain)*

P4.72 Long term surgical results of nonpenetrating deep sclerectomy using the Ologen implant vs. the Esnoper V2000 implant
Xavier Garrell Salat, Jaume Rigo, David Aragón Roca, Sandra Banderas García, Fernando Trejo, Marta Castany *(Spain)*

P4.73 Intraocular pressure outcomes and failure risk factors of non penetrating deep sclerectomy: the AGORA registry study
Cédric Schweitzer, Melanie Le Goff, Cindya Achoun, Ewen Le-Quilliec, Charlotte Kalisky, Emilie Tournaire-Marques *(France)*

P4.74 Prospective evaluation of micropulse diode transscleral cyclophotocoagulation in uncontrolled glaucoma patients: a case series
Marta Garrido Marín, Laura Sánchez Vela, Rafael Fischer, Alejandro Pardo Aranda, Jaume Rigo, Manuel Antonio Amilburu Pérez, Antoni Dou, Marta Castany, Olivia Pujol Carreras *(Spain)*

P4.75 Registry study of two trabecular micro-bypass iStents© implantation combined with cataract surgery in various glaucoma types and severities: long-term real-life outcomes
Assoun Marine, Audrey Cougnard-Gregoire, Charlotte Kalisky, Emilie Tournaire-Marques, Melanie Le Goff, Cédric Schweitzer *(France)*

P4.76 Choice of anaesthetic technique for trabeculectomy surgery and analysis of post-operative outcomes
Priyanka Asodaria, Jia Ng, Gerassimos Lascaratos, Sameer Trikha, Avi Kulkarni *(United Kingdom)*

P4.77 Effect of the Prolene stent suture on the Baerveldt tube tip position
Chandni Nigam, Jia Ng, Lauren Van Lancker, Sameer Trikha, Avinash Kulkarni, Gerassimos Lascaratos *(United Kingdom)*

P4.78 Early results of PreserFlo microshunt to control intraocular pressure in eyes with previous failed trabeculectomy
Jia Ng, Gerassimos Lascaratos, Sameer Trikha, Avi Kulkarni *(United Kingdom)*

P4.01
OCT-A analysis of filtration bleb vascularization after Santen PreserFlo MicroShunt implantation

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Purpose: To investigate filtration bleb vascularization after ab-externo implantation of the Santen PreserFlo MicroShunt using anterior segment OCT-angiography.

Methods: 9 patients underwent PreserFlo MicroShunt implantation according to the standard protocol recommended by Santen. The pre- and postoperative drug regimen was according to department standards. At 1 week, 2 weeks, 1 months, 2 months, 3 months and 6 months postoperatively, OCT-A images of the filtration bleb were acquired using a Zeiss Plex Elite 9000 angio-OCT. A 20D add-on lens enables anterior segment imaging with the device. A 3x3 mm rectangle (posterior pole scale, equals approx. 6x6 mm on the anterior surface) was imaged. Vascularization was assessed by calculating the perfusion density using algorithms provided by Zeiss (ARI network).

Results: Perfusion density in the filtration bleb was 30.82, 26.33, 29.09, 29.06 and 25.09 respectively (1 w, 2 w, 1 m, 2 m, 3 m, 6 m) ($p = 0.432$). IOP decreased from 21.85 ± 6.80 mmHg to 7.69 ± 1.77 mmHg, 8.54 ± 1.98 mmHg, 10.84 ± 2.71 mmHg, 11.92 ± 4.21 mmHg, 11.08 ± 4.66 mmHg and 13.40 ± 8.99 mmHg.

Conclusion: The present study demonstrates that the perfusion density algorithm on the Zeiss Plex Elite can be used to monitor filtration bleb vascularization longitudinally. Larger cohorts are needed to gain insight in the relationship between bleb vascularization and surgical outcome.

P4.02
Non-penetrating deep sclerectomy versus standalone XEN gel stent: a retrospective comparative study

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Purpose: To compare surgical success and safety profile of non-penetrating deep sclerectomy (NPDS) and XEN gel stent

Methods: A retrospective chart review of 328 eyes of 282 patients who were scheduled for standalone XEN gel stent surgery (n = 140) or NPDS (n = 188) at Groupe Hospitalier Paris Saint-Joseph between January 2017 and December 2018 was conducted. The primary outcome was surgical success at last follow-up clinical examination. Complete and qualified surgical success were defined by an IOP≤18 mmHg and a reduction of IOP≥20% without or with hypotensive medication, respectively.

Results: In total, 82 eyes were included in the XEN group and 117 eyes in the NPDS group. In the one-eye analysis, rates of "complete success" and "qualified success" were respectively at the end of follow-up 28.57% and 20.00% in the XEN group, and 42.71% and 16.67% in the NPDS group ($p = 0.17$). Survival plots based on Kaplan Meier estimate for overall surgical success demonstrated a median survival time of 3.73 years for the NPDS group and 2.38 years for the XEN group ($p < 0.0001$). After adjustment for confounding variables using Cox regression, the NPDS procedure was significantly more associated with surgical success than the XEN gel stent implantation ($p < 0.001$). No difference was demonstrated in terms of reduction of antiglaucoma medications, needling procedures, reoperations or complications.

Conclusion: The NPDS procedure may be more efficient than the XEN gel stent in reducing IOP in patients with open angle-glaucoma and may result in longer surgical success. However, a well-conducted prospective randomized study is required to confirm these results.

P4.03
Long-term outcomes of micropulse transscleral cyclophotocoagulation in a tertiary hospital

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Purpose: To evaluate the safety and efficacy of micropulse transscleral cyclophotocoagulation (MP-TSCPC) in glaucoma patients, with standard parameters, over a 2-year period.

Methods: A retrospective non-randomized study was carried out. Patients with refractory glaucoma were treated with MP-TSCPC from January 2018 to December 2020. Patients undergone 160 seconds of LASER treatment with settings of 2000 mW/cm2 and a duty cycle of 31.3%.

Results: A total of 61 eyes from 46 patients were included, with a mean age distribution of 73.9 ± 10.8 years. The most frequent diagnosis was primary open angle glaucoma and the mean best corrected visual acuity was 5/10. More than one third of patients had undergone at least one glaucoma filtration surgery prior to MP-TSCPC. Mean pre-treatment intraocular pressure (IOP) was 24.9 ± 8.6 mmHg. Except for the 24 months follow-up, every other follow-up visit had a significant reduction ($p \leq 0.001$) in IOP. The mean number of topical drugs required to control IOP decreased from four to three and almost all patients taking oral acetazolamide suspended it (17 of 19 cases). Total success rate (absolute and clinical successes combined) was 81.9% after two years of the treatment. There is a positive and significant correlation between prior glaucoma surgery and need for re-intervention ($p = 0.028$). No loss of visual acuity was observed or any reports of serious complications.

Conclusion: MP-TSCPC is an effective and safe procedure in reducing IOP within a broad spectrum of refractory glaucoma patients. Additional studies are needed to consolidate the current indications and to customize the optimal treatment settings in an individual basis.

P4.04
Trabeculectomy surgical skill training program aimed at 3rd year residents and fellows, performed at Hospital Italiano de Buenos Aires, on animal eye models

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Purpose: To show a trabeculectomy surgical skill training program aimed at 3rd year residents and fellows, performed at Hospital Italiano de Buenos Aires, on animal eye models.

Methods: Our surgical skill training model enables trainee surgeons to practice all steps of trabeculectomy surgery prior performing hands-on surgery in human eyes. This training program is performed at a wet laboratory located within our teaching hospital's premises. The lab is equipped with all surgical instruments, and a double eye piece microscope for trainee and mentor use. The surgery is performed in a step-wise manner on enucleated pig eyes. First, the trainee must get familiarized with the surgical procedure by means of visual and theoretical aids. Then, they must perform all the surgical steps on cadaveric pigs' eyes under supervision. Finally, the trainee must complete each individual step of the surgery several times by themselves and report their advance and/or challenges to their mentor by recording videos and taking photographs. The training is completed once these three steps have been successfully approved by a surgical instructor.

Results: With this training program we managed to significantly reduce timing and improve efficacy of the surgical learning process. After all the three steps are completed, the residents and fellows are usually capable of performing almost every step of the surgery by themselves in their first hands-on attempt. In addition, this model helped improve the speed of the procedure and significantly reduce surgical and OR times, as well as surgeon changes.

Conclusion: This program has proven to improve trainees' surgical skills and confidence prior entering the OR to perform trabeculectomy surgery, allowing for better surgical outcomes from their first hands-on attempt.

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P4.05
The Moorfields safer surgery system trabeculectomy surgical outcomes: a 10-year retrospective study

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Purpose: In the present study we aim to evaluate complications and success rate of trabeculectomy with MSS (Moorfields Safer Surgery System) in a single center over a 10-year period.

Methods: We conducted a 10-year retrospective study from January 2011 to December 2020, reviewing patient medical records of all patients submitted to MSS trabeculectomy during that period of time and evaluated early and late postoperative complications (< 3 months and > 3 months after the procedure, respectively), intraocular pressure (IOP) changes over time (1st day, 1st week, 2nd week, 1st month, 3rd month, 6th month, 1st year, 1st year and a half, and then annually, up to a 10 year follow-up) and surgical success. Absolute success was defined as > 20% IOP reduction and IOP < 21 mmHg without medication, qualified success as > 20% IOP reduction and IOP < 21 mmHg with medication and failure as < 20% IOP reduction and/or IOP > 21 mmHg.

Results: In the 10-year period previously mentioned, 193 eyes were submitted to MSS trabeculectomy. The study included 173 eyes (from 140 patients), 95 male and 78 female, with a mean ± standard deviation age of 65.88 ± 15.0 years. The 3 most frequent glaucoma types were primary open angle glaucoma (80 eyes, 46.24%), pseudoexfoliative glaucoma (43 eyes, 24.86%) and closed angle glaucoma (23 eyes, 13.30%) Out of 102 evaluated eyes, early postoperative complications reported were: 12.7% clinical hypotony, 12.7% seidel, 11.76% hyphema, 8.8% choroidal detachment and 2.9% flat anterior chamber. Mean IOP post procedure was 10.1 mmHg on the 1st day 9.28 mmHg after 1 week, 13.88 mmHg after 1 month, 13.38 mmHg after 6 months and 13.19 mmHg at 1 year follow up. As for surgery success, out of 155 eligible eyes with a mean average follow up time of 47 months, 60 were classified as absolute success (38.7%), 73 as qualified success (47.1%) and there were 22 cases of surgical failure (14.2%).

Conclusion: MSS trabeculectomy is a safe and effective alternative to conventional trabeculectomy as it allows a more reproducible technique, increased safety associated with an increased IOP control, as well as decreasing postoperative complications.

P4.06
Postoperative assessment following iStent Inject W implant with NIDEK GS-1 automated gonioscopy

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Purpose: iStent Inject® W (Glaukos™) is designed to be inserted through the trabecular meshwork (TM). The injector contains 2 stents, that are advised to be placed at least 2 clock hours apart from each other, in order to achieve maximal efficacy[1]. Gonioscopy is used to assess stents' position postoperatively. However, manual gonioscopy is subjective and offers a brief image of the iridocorneal angle (ICA). Automated gonioscopy has been proposed to be a more objective alternative for ICA examination[2]. The purpose of this study is to evaluate the postoperative outcomes of iStent by using an automated gonioscope.

Methods: Observational study. Patients diagnosed with open angle glaucoma underwent phacoemulsification combined with iStent inject® W. The ICAs were imaged with NIDEK GS-1 automated gonioscope (NIDEK™, Japan), 1 months postoperatively. Two independent observers graded stents' position as follow:
- "correct position": placed within TM
- "incorrect position": placed anterior or posterior to the TM
When two stents were placed in the same eye, the distance

between them was also graded:
- "correct distance": stents were equal to or more than 2 clock hours apart
- "incorrect distance": stents were less than 2 clock hours apart

Results: Thirty-two iStents from 16 eyes were imaged. Three images were excluded due to poor quality. Overall IOP reduction of 14.3 % (p = 0.049) was observed one month postoperatively. Two eyes (10.5%) had only one stent implanted. Twenty-three (71.8%) stents were graded in "correct position" by both observers. Seven eyes were graded as having "correct distance" between stents by both observers. Of them, 6 were also deemed to have "correct position" for all stents. The IOP reduction observed in eyes with both stents in "correct position" and "correct distance" was 21.3% (p = 0.181); while that one observed in eyes with either only 1 stent, or "incorrect position" or "incorrect distance" was 10.2% (p < 0.05)

Conclusion: We observed an IOP reduction whether or not stents were placed on target location ("correct position" and "correct distance"). Stents on target location were more effective than those not on target location. NIDEK GS-1 automated gonioscope provided an overall good image quality and agreement between observers.

P4.07
Smart app to predict best personalized minimally invasive glaucoma treatment (iMIGS)

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Purpose: To evaluate the effective predictability of an AI-based Treatment Advice system, as an App (iMIGS), in making a smart personalized selection of the available Minimally Invasive Glaucoma Surgery (MIGS) options, from the baseline clinical parameters.

Methods: An AI algorithm, Adaptive Neuro Fuzzy Inference System (ANFIS), was used with MIGS data set which was a retrospective case series of patients who underwent either of the four MIGS procedures [Stent, iStent and Endoscopic Cyclophotocoagulation (ICE2), PreserFlo Micro Shunt (PMS) and XEN-45], with or without Phacoemulsification cataract surgery from July 2016 till May 2020 at a single Centre in UK. The AI algorithm was trained using baseline measurements such as age, visual acuity, visual field, intra-ocular pressure (IOP), glaucoma type, number of anti-Glaucoma drops patient is on. The system then predicts one of four possible MIGS which would be most suitable for the patient.

Results: The proposed ANFIS system was found to be 91% accurate (89% on average) with high Sensitivity (80%) and Specificity (90%), as well as low false positive rate (7%) and low miss-rate (20%).

Conclusion: The ANFIS technique outperformed the other popular techniques (such as Support Vector Machine, Shallow Neural Networks and Regression,models) with a multitude of scales and has shown very promising approach for predicting the treatment classes based on the initial clinical measurements.

P4.08
The effect of different post-selective laser trabeculoplasty treatment modalities on intra-ocular pressure reduction

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Purpose: To compare the efficacy of selective laser trabeculoplasty (SLT) for the treatment of ocular hypertension or open angle glaucoma, when either short-term topical non-steroidal anti-inflammatory drugs (NSAIDs), topical steroids or no drops were administered after treatment.

Methods: The patients received topical ketorolac 0.5%, dexamethasone 0.1% eye drops for one week after SLT treatment or no drops at all. Initial IOP, previous SLT, prior use of topical medications and SLT power setting were recorded. The SLT power ranged from 0.5 to a maximum of 1.2 mJ, and this range was subdivided into 3 groups based on the minimum power needed to induce a micro-bubble reaction (Low: 0.5-0.7 mJ, Medium: 0.8-1mJ and High: 1.1-1.2 mJ).

Results: Ninety eyes of 90 patients were retrospectively identified with 30 eyes in each treatment group. The mean pre-treatment IOP was similar across treatment groups (p = 0.5). At week 6, the mean ± SD reduction of IOP as a percentage from baseline in the NSAID, steroid and control groups were 32.2 ± 14.7%, 26.8 ± 17.3% and 27.5 ± 15.1% respectively (p = 0.4). Increasing the SLT power resulted in a larger reduction of IOP, though this was not statistically significant (mean ± SD reduction for low, medium and high-power settings were 26.9 ± 15.1%, 29.2 ± 15.7% and 30.7 ± 17.2% respectively; p = 0.5). The correlation coefficients (r) between IOP reduction and pre-treatment IOP, previous SLT and prior use of topical medications were 0.3, -0.18 and -0.23 respectively.

Conclusion: IOP reduction was statistically significant in all groups at 6 weeks post-treatment. Patient receiving NSAID demonstrated a non-significant superiority in IOP reduction. Pre-treatment IOP proved to be an important predictor for SLT efficacy. Despite the negative impact of prior medication use and previous SLT on IOP reduction, SLT was still effective in managing these patients. The higher the energy used, the greater the reduction in pressure observed. However, further studies are needed to determine an upper energy limit that can be safely used with topical anti-inflammatory cover.

P4.09
A retrospective review of PreserFlo MicroShunt surgery at a single surgical centre in England

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Purposes: To evaluate the effectiveness of the PreserFlo MicroShunt at a single surgical centre (The Colchester Eye Centre of Excellence, Essex UK). To analyse the intraocular pressure (IOP) change with time, the change in treatment drops and the complications encountered after PreserFlo insertion.

Methods: A retrospective case review of all PreserFlo cases performed. In total, 154 surgical cases were identified from 141 patients (some bilateral) between November 2020 and December 2021. Demographic data collected, as well as changes

in IOP, glaucoma drop usage and complications, followed by statistical analysis.

Results: There was a statistically significant reduction in IOP from baseline at all time periods analysed: 1 week, then 1, 3, 6, 9 and 12 months (Fig.1). There was a significant reduction in glaucoma drop use at all time periods (Fig. 1). 78% of cases achieved an IOP reduction of greater than 20% and 70% achieved a reduction greater than 30%, the majority of these without glaucoma drops. Revision of the implant was performed in 6% of cases and bleb-needling or injection of antimetabolite was performed in 10% of cases. Hyphaema was the commonest complication, however washout was only performed in 2 cases (1.3%). Numerical hypotony occurred in 15% of cases but this resolved rapidly within a few weeks with only a few cases encountering temporary choroidal folds or maculopathy.

Conclusions: Our results suggest that PreserFlo MicroShunt is an effective treatment for glaucoma, achieving significant reduction in IOP and a reduced need for topical glaucoma drop application. There were few non-sight-threatening complications, however there was a need for revision or needling in several cases. Longer follow up is required to analyse the survival and intervention rate of the PreserFlo micro-shunt over longer periods of time.

P4.10
Intermediate-term outcomes of combined phacoemulsification with ab interno excisional goniotomy with the Kahook Dual Blade

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Purpose: To evaluate efficacy and safety of combined phacoemulsification with ab interno excisional goniotomy with the Kahook dual blade.

Methods: Retrospective, unmasked, single-surgeon, non-comparative, consecutive interventional case series of n = 17 eyes/patients with follow-up > one month were included. If both eyes eligible the eye with the longest follow-up was selected. Demographic information, diagnosis and complications were tabulated. Typical follow-up included post-op day one and seven, post-op month one, three and six and every 6 months thereafter. Kaplan Meier survival curves were constructed. For this purpose, the last observation was carried forward but no more than 1 week during the first post-operative month and no longer than one month thereafter. Success was defined as percentage reduction in intraocular pressure (IOP) >20% compared to baseline without de novo incisional glaucoma surgery or increase in medications.

Results: The average age of the cohort was 72.1 ± 7.5 years, IOP at baseline measured 21.3 ± 3.5 mmHg on 2.8 ± 1.3 medication classes. 47% of patients suffered from primary open angle glaucoma and the average mean deviation of the cohort on static automated perimetry measured -6.8 ± 7.7dB. After a median follow-up of 11 months (range 1-52 months) the IOP at the last follow-up visit measured 16 ± 2.7 mmHg (paired t-test, $p < 0.0002$) while on 2.4 ± 1.3 medication classes (paired t-test, $p = 0.002$). No patient underwent re-operation for glaucoma, or escalation of medical treatment and no eye was free of medications at the last follow-up. 41% of eyes had documented layering hyphema on the first post-operative day that cleared spontaneously in all cases by post-op day#7. 29% of eyes manifested an early IOP spike (IOp > 30 mmHg) either on POD #1 or #7. Success-rate at the last follow-up visit measured 59%.

Conclusion: Combined phacoemulsification with ab interno excisional goniotomy appears to be a reasonable option for patients with cataracts and mild to moderate glaucoma in need of a modest pressure reduction.

P4.11
Selective laser trabeculoplasty (SLT) as an adjunct therapy in advanced pseudoexfoliative glaucoma and advanced primary open angle glaucoma

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Purpose: Selective laser trabeculoplasty (SLT) is a proven, safe and effective treatment for early stage glaucoma.[1–3] However, fewer studies have reported on its efficacy in advanced stages of the disease.[4] Our aim was to evaluate the efficacy and safety of SLT in patients with advanced pseudoexfoliative glaucoma (PXFG) and advanced primary open angle glaucoma (POAG).

Methods: This single-center, retrospective chart review consecutive series comprised advanced stage glaucoma patients treated by a single session of 360 degree SLT to reduce intraocular pressure (IOP) or decrease the number of topical medications in cases of discomfort and allergy. The study took place between 1/1/2019-5/31/2021. Inclusion criteria: 1) advanced stage PXFG or POAG as defined by the reproducible mean deviation (MD) worse than -12.00dB on the Humphrey visual field[5]; 2) under maximal tolerated medical therapy. Patients lost to follow-up were excluded. The main outcome measure was defined as a > 20% reduction in IOP three months after the procedure. Secondary outcomes were the relative decrease in IOP and achieving a target IOP < 14 mmHg. Adverse events were recorded.

Results: Of the 84 eyes (62 patients) included in the final analysis, 45 (53.6%) exhibited advanced PXFG and 39 (46.4%) advanced POAG, baseline IOP was 18.8 ± 5.2 mmHg and 17.8 ± 4.4 mmHg, respectively. The primary outcome was met in 22 eyes (49%) with advanced PXFG and in 15 eyes (38%) with advanced POAG. No statistically significant difference was found in the success rate between the two groups ($p = 0.34$). The median decrease in IOP was 19.4% [interquartile range (IQR) 0.8%-30%] and 17.05% [IQR 0-30%] in the patients with PXFG and POAG, respectively. Three months after SLT, 17 (37%, RR 2 95%CI [1.05-3.8]) and 16 (41%, RR 2.2 95%CI [1.06-4.9]) of the treated eyes with PXFG and POAG, respectively, achieved target pressure. The therapeutic regime, MD and BCVA remained stable during follow-up. There were no adverse events

Conclusion: SLT may be an effective adjunctive treatment for advanced POAG and PXFG patients, possibly circumventing the need for further surgical intervention.

P4.12
Goniotomy with Kahook Dual Blade in medically uncontrolled glaucoma

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Purpose: To evaluate the 12-month efficacy and safety of Kahook Dual Blade goniotomy in glaucoma patients with unacceptable visual field progress and/or elevated intraocular pressure (IOP).

Methods: Retrospective study in patients with primary open angle glaucoma (POAG) and pseudoexfoliation glaucoma (PEXG), that underwent goniotomy with Kahook Dual Blade (KDB), as stand-alone (KDB group) or in combination with phacoemulsification (phaco-KDB group). All patients were progressing on ≥ 3 medications. Main outcome parameters were number of eyes with intraocular pressure (IOP) ≤ 15, ≤ 18 and ≤ 21 mmHg after one year. Secondary outcome was number of eyes with ≥ 20% IOP reduction and/or reduction with ≥ 1 medication. We also assessed the incidence of further glaucoma surgery (including transscleral cyclophotocoagulation) and the frequency of adverse events within one year of follow-up.

Results: A total of 101 eyes of 90 patients were included, 39 eyes in the KDB group (36% POAG and 64% PEXG) and 62 eyes in the phaco-KDB group (43% POAG and 57% PEXG). At 12 months, 53.8%, 80.8% and 84.6% in the KDB group, and 69.1%, 90.9% and 98.2% in the phaco-KDB group, achieved IOP-levels ≤ 15, ≤ 18 and ≤ 21 mmHg. Number of eyes that achieved IOP reduction of ≥20% and/or reduction with ≥1 medication at 12 months (without further IOP-lowering procedures or added medications) was 57% in the KDB group, and 83% in the phaco-KDB group. Mean IOP was reduced from 24.8 (8.3) (mean (standard deviation)) to 16.2 (5.4) mmHg in the KDB group ($p < 0.001$), and from 22.0 (5.8) to 14.7 (2.9) mmHg in the phaco-KDB group ($p < 0.001$). Medications were reduced from 3.5 (0.6) to 3.1 (1.0) in the KDB group ($p = 0.038$), and from 3.3 (0.5) to 1.8 (1.3) in the phaco-KDB group ($p < 0.001$). Nine eyes required additional surgery within one year. The main adverse events were transient hyphemas (11%) and IOP-spikes (10%).

Conclusion: KDB, as stand-alone or in combination with cataract surgery, has a significant IOP lowering effect after one year in medically uncontrolled glaucoma.

P4.13
Short term safety and efficacy of the PreserFlo MicroShunt in high risk glaucoma patients who have undergone conjunctival scarring procedures including: trabeculectomy, tube surgery and diodes

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Purpose: The optimal surgical management of glaucoma following failed sub-conjunctival filtering or other conjunctival scarring procedures, whereby conjunctival integrity is affected, remains a challenge. PreserFlo® MicroShunt, (Santen, Osaka, Japan) is a novel sub-conjunctival implant and demonstrates promising results in eyes without previous surgery. This pilot study evaluates the short term efficacy and safety of PreserFlo MicroShunt in high risk glaucoma patients that have undergone conjunctival scarring procedures

Methods: Retrospective analysis of patients undergoing PreserFlo MicroShunt procedure from September 2020 to September 2021 with any type of glaucoma. Inclusion criteria of at least one previous filtration or conjunctival scarring procedure including trabeculectomy, tube surgery and diodes. Electronic patient record system was used to monitor best corrected visual acuity, intra-ocular pressure (IOP), number of topical agents and complications over 6 months at Western Eye Hospital, United Kingdom.

Results: 15 PreserFlo MicroShunt procedures from 14 patients were analysed with a mean age of 66 ± 12.38 years and a mean Logmar visual acuity of 0.69 ± 0.83. 66.67% of eyes had primary open angle glaucoma, 26.67% secondary glaucoma and 6.67% ocular hypertension. Average number of previous conjunctival scarring procedures (28.57 % filtration surgery) was 2.53 with a mean preoperative IOP of 23.20 ± 6.41 mmHg. There was significant reduction of mean IOP by 25% ($p < 0.05$) at 6 month to 17.40 ± 7.84 mmHg. Corresponding reduction ($p < 0.05$) of mean number of topical agents required to control pressure from baseline of 2.80 ± 1.26 to 0.93 ± 1.22 at 6 months with 53.33% of patients free of topical agents. Bleb needling was performed in 33.33% and further revision or surgery were required in 33.33%. Adverse events were transient including hypotony, choroidal effusion and hyphaema. There was no significant change in the visual acuity and central retinal thickness.

Conclusion: PreserFlo MicroShunt implantation is effective at reducing intraocular pressure in eyes with previous conjunctival scarring procedures. As expected in this high risk cohort, a proportion required bleb needling and / further surgery. Additional work is needed to confirm efficacy and identify risk factors in the long term.

P4.14
Efficacy and safety of combined 27-G vitrectomy and Ahmed valve using same sclerotomy site for the tube placement: a case series

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Purpose: We herein report a case series aiming to describe the feasibility and postoperative outcomes of combined 27G pars plana vitrectomy (PPV) and Ahmed Glaucoma Valve (AGV) placement using the same sclerotomy.

Methods: This is a retrospective (historical perspective) case series of 4 eyes of four patients who underwent a combined minimally invasive vitrectomy surgery (MIVS) using 27G technology and a subsequent AGV implantation with the tube placement in the vitreous cavity. Three of the cases were patients with malignant glaucoma refractory to medical and laser treatment, and the fourth was a patient with a history of multiple glaucoma surgeries and a previous corneal transplant

with endothelial involvement. Preoperative and postoperative data up to 12-months follow-up were collected, including demographics, type of glaucoma, intraocular pressure (IOP) and glaucoma medications, and intraoperative and postoperative complications.

Results: Four eyes of four patients underwent a MIVS using 27G and AGV tube placement in the vitreous cavity using the same sclerotomy, although in two patients a slight wound enlargement was required to allow tube introduction through the sclera. After one year, IOP and glaucoma medications were reduced from 41.5 ± 19.1 to 14.5 ± 3.1 mmHg and from 3 (3-3) to 1.5 (1.5-3.5), respectively. Although no sight-threatening postoperative complications were found, 3 patients developed cystoid macular edema and 3 had a hypertensive postoperative phase that was controlled with medication.

Conclusion: The first-reported cases of combined MIVS using 27G and AGV showed a reduction of IOP and antiglaucoma medication. Placing the tube using the same PPV sclerotomy location is feasible, although a slight enlargement may be required. Therefore, in cases in which an AGV implant has to be accompanied by a vitrectomy, the decision of whether or not to use 27G could be conditional, mainly, by the indication of retinal surgery and / or the preferences of the retinal surgeon.

P4.15
Two-year safety and efficacy results of a supraciliary drainage device in patients with open angle glaucoma - a meta-analysis from STAR-I, STAR-II and STAR-III trials

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Purpose: Describe the safety and efficacy profile 2 years after implantation of a novel, supraciliary, minimally-invasive glaucoma surgery drainage device, MINIject® (iSTAR Medical, Belgium) in patients with medically-uncontrolled, primary open-angle glaucoma.

Methods: Data from 3 completed, prospective, multi-centre, interventional, single-arm studies (STAR-I: NCT03193736, STAR-II: NCT03624361, STAR-III: NCT03996200) were pooled in a meta-analysis. Patients were treated at 11 sites in Colombia, France, Germany, India, Panama and Spain. Results from a total of 66 patients across these studies who received the implant and who completed 2-year follow-up are presented here. MINIject® is a 5mm long network of hollow spheres made of soft, flexible silicone. It has been implanted standalone and ab-interno into the supraciliary space (Fig. 1).

Results: At 2-year follow-up, mean diurnal IOP was 14.4 ± 4.5 mmHg, representing a 39% mean reduction from preoperative baseline (23.8 ± 3.3 mmHg, n = 79). The mean IOP level and reduction were similar at all semi-annual follow-up visits until 2 years, therefore representing a stable result over time (Figure 2). Similarly, medications were reduced from preoperative 2.4 ± 1.0 (n = 79) to 1.3 ± 1.4, with 41% of patients medication-free at 2 years. IOP ≤ 18 mmHg was achieved in 85% of patients. The most common adverse events were: transient anterior chamber inflammation, IOP elevation, reduced visual acuity and visual field defect. The mean reduction in central endothelial cell density was 6%, with no patient exceeding 30% loss from preoperative baseline.

Conclusion: This meta-analysis strengthens the evidence for this supraciliary drainage device implanted in a standalone procedure without requiring bleb management or needling. The implant achieved a powerful and stable efficacy over 2-year follow-up without compromising patient safety.

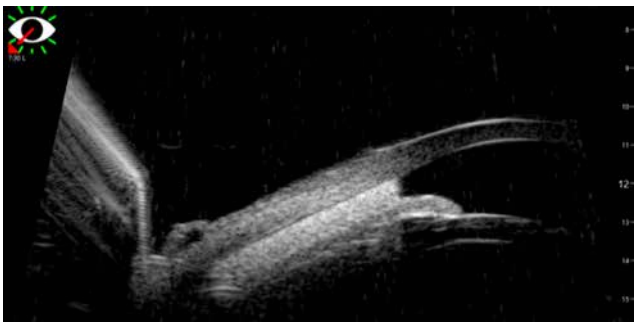

Figure 1. MINIject® implanted in the supraciliary space

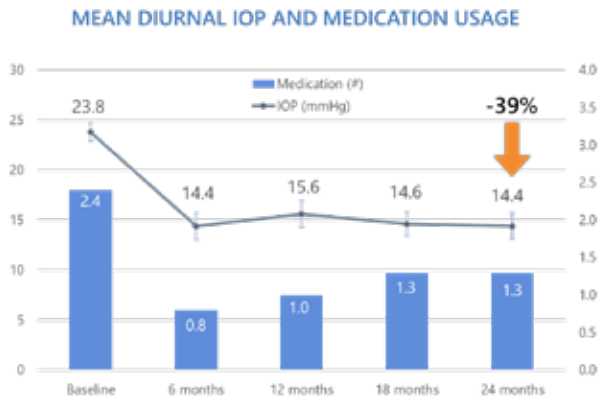

Figure 2. Mean IOP and IOP-lowering medication at study visits. Mean relative reduction in IOP from pre-implantation baseline is indicated at 24-months. Error bars show 95% confidence intervals. n = 79 at baseline, n = 73 at 6,12 months, n = 69 at 18 months, n = 66 at 24 months.

P4.16
Descemet membrane detachment after non-penetrating deep sclerectomy associated to increased pressure in the scleral lake

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Purpose: To present three cases of descemet membrane detachment (DMD) after non-penetrating deep sclerectomy (NPDS) caused by increased pressure in the bleb or scleral lake and whose resolution allowed reattachment.

Methods: We reviewed three cases seen at our hospital with DMD occurring after NPDS from January 2020 to May 2021.

Results: Case 1: 77-year-old woman who underwent Phaco-NPDS OS in March 2021. 25 days after came to the emergency room due to decreased visual acuity (VA) with a DMD in the upper hemicornea associated with a tenon cyst and IOP 21 mmHg. Needling + MMC + SF6 20% in anterior chamber was performed, achieving the full resolution of the condition. Seven months later VA is 0.9 and IOP 15 mmHg with aqueous inhibitors. Case 2: 75-year-old patient who underwent NPDS OD in 2013. In June 2019, a fixed dorzolamide/timolol combination was added to that eye with IOP 18 mmHg. During the following months, the patient came to the emergency room several times due to

nonspecific discomfort and pruritus OU being diagnosed with papillary conjunctivitis treated with topic hydrocortisone, lid hygiene and lubrication. In January 2020 she was diagnosed with a DMD of the upper hemicornea probably related to rubbing, that resolved a week later with conservative treatment. Fixed combination was replaced with tafluprost. 18 months later DM is attached, VA is 0.6 and IOP 15 mmHg.
Case 3: 67-year-old patient who, one month after NPDS (April 2021), had IOP 21 mmHg and a domed scleral lake due to partial closure of superficial scleral flap contour with minimal conjunctival leakage objectified with OCTA. It was decided to perform ocular massage in an attempt to increase filtration, causing, however, a DMD in the upper hemicornea that resolved in 24 hours by adding aqueous inhibitors. Subsequently, it was necessary to perform a needling + MMC and goniopuncture, VA is 0.9 and IOP 16 mmHg without treatment six months later.

Conclusion: DMD should be considered as a potential complication of NPDS. Late detachments can be caused by increased pressure in the scleral lake. They usually show good evolution once this condition is resolved.

P4.17
Transient ciliochoroidal detachment after microhook ab interno trabeculotomy

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Purpose: To investigate ciliochoroidal detachment (CCD) after microhook ab interno trabeculotomy and evaluate its effect on intraocular pressure (IOP) after surgery.

Methods: We prospectively examined 41 eyes of 49 patients after microhook ab interno trabeculotomy. The inner wall of Schlemm's canal and trabecular meshwork were incised by a microhook at nasal quadrant. CCD was detected by anterior-segment optical coherence tomography (AS-OCT). Imaging was performed independently in each of the 4 quadrants, as well as 30° superior and inferior at the nasal area. All patients underwent AS-OCT examination at postoperative day 1, 1 month and 2 months.

Results: At postoperatively day 1, CCD was detected in 14 of 49 eyes (28.6%) (CCD group) using AS-OCT. However, CCD was disappeared within 1 month after surgery in all cases. The mean IOPs for the CCD group vs the non-CCD group were 17.4 ± 7.7 mmHg vs 15.4 ± 5.8 mmHg before surgery and 12.8 ± 5.2 mmHg vs 14.4 ± 6.5 mmHg at day 1, 12.0 ± 4.0 mmHg vs 12.6 ± 4.5 mmHg at day 3, 14.1 ± 5.0 mmHg vs 13.9 ± 3.8 mmHg at day 7, 13.4 ± 2.8 mmHg vs 12.4 ± 2.5 mmHg at 1 month, and 12.3 ± 1.7 mmHg vs 11.9 ± 3.4 mmHg at 2 months. The postoperative IOPs at all follow-up periods were not significantly difference between both groups. In 7 of 14 eyes in the CCD group, the AS-OCT images revealed a connection between the CCD and anterior chamber via the trabeculotomy sites.

Conclusion: Although CCD occurred in approximately 30% of patients after microhook ab interno trabeculotomy, all postoperative CCD disappeared within 1 month after surgery. CCD was not associated with low IOP immediately after surgery.

P4.18
Ultrasound cyclo-plasty using high-intensity focused ultrasound in open angle glaucoma myopic patients

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Purpose: To compare the efficacy of the ultrasound cyclo-plasty (UCP) procedure using High-Intensity Focused Ultrasound in two different populations: myopic and non-myopic patients. Myopic eyes compared to non- myopic eyes present a thinner sclera and this could influence the ultrasound effect.

Methods: Monocentric, prospective, non-randomized, double-arm clinical trial. A cohort of thirty-six patients (36 eyes) with open angle glaucoma underwent UCP treatment between January and November 2020. Patients were divided in two groups based on the eye axial length: Group A with an axial length > 25.00 mm and group B with an axial length < 25.00 mm. Each patient underwent UCP using a therapy probe containing six piezoelectric transducers, sequentially activated for 8s' each. A complete ophthalmic evaluation was performed before the UCP procedure and 1, 7, 30, 60, 90, 180 and 365 days after treatment. Complete success was defined as intraocular pressure (IOP) lowering ≥ 20% without additional medication and IOP >5 mmHg. Secondary, complications were recorded.

Results: Group A consisted of 17 (47%) eyes and group B of 19 (53%) eyes. The two groups at baseline were comparable except for age and blood pressure. The mean axial length was 27.61 ± 1.61 mm in group A and 23.51 ± 0.68 mm in group B ($p < 0.01$). All patients completed the one-year follow-up in both groups. At baseline mean IOP was 25.8 ± 8.5 mmHg in group A and 27.7 ± 7.7 mmHg for group B ($p = 0.48$) and the mean number of glaucoma medications was 2.8 ± 0.9 and 2.6 ± 1.0 respectively ($p = 0.57$). Complete success was achieved in 71% of patients for group A and 74% for group B with a mean IOP value 1 year after treatment of 15.8 ± 4.1 mmHg for myopic group and 18.1 ± 5.6 mmHg for non-myopic group ($p < 0.01$). One year after the UCP procedure the IOP lowering ($p = 0.88$) and the number of medications ($p = 0.36$) did not differ between myopic and non-myopic eyes. Complications observed were similar, transient and solve spontaneously in both groups.

Conclusion: Ultrasound cyclo-plasty is an effective and well-tolerated strategy to lower IOP in myopic patients with open-angle glaucoma.

P4.19
Five-year results with the PreserFlo™ MicroShunt for surgical treatment of glaucoma

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Purpose: To report long-term effectiveness and safety of the PreserFlo™ MicroShunt (Santen Pharmaceutical Co., Osaka, Japan) (MicroShunt) for the surgical treatment of open-angle glaucoma.

Methods: Patients underwent a MicroShunt implantation at the University Eye Clinic of Maastricht between April 2016 and February 2020. MicroShunt implantation was usually performed under Sub-Tenon's anesthesia, and augmented with MMC. Main outcome was mean intraocular pressure (IOP) during follow-

up. Furthermore, information on IOP-lowering medication use, reoperation rates and postoperative complications was collected.

Results: Sixty-four eyes were included. Diagnoses included primary open-angle glaucoma (78%), pigmentary glaucoma (19%) and pseudoexfoliation glaucoma (3%). The majority of patients had moderate or advanced glaucoma (69%) based on the mean deviation of the visual field. In the overall study population, mean ± SD IOP dropped from 20.8 ± 5.5 mmHg at baseline to 12.1 ± 2.4 mmHg, 12.4 ± 2.5 mmHg and 12.5 ± 2.9 mmHg at three (n = 32), four (n = 21), and five (n = 15) years postoperatively, respectively ($p < 0.0001$). Mean IOP lowering medication use dropped from 2.5 ± 1.6 at baseline to 0.8 ± 1.1, 1.1 ± 1.2 and 1.2 ± 1.1 after three, four, and five years. Postoperative complications were usually mild and self-limiting and included early hypotony, shallow anterior chamber and hyphema. Needling or surgical revision was performed in eight cases (13%). Twelve eyes (19%) required further incisional glaucoma surgery (trabeculectomy, glaucoma drainage device or a second MicroShunt) during the study period.

Conclusion: PreserFlo™ MicroShunt is a safe and effective procedure for open-angle glaucoma patients, leading to a sustained reduction in IOP and number of IOP lowering medications in a majority of cases.

P4.20
Expert consensus on the use of the PreserFlo™ MicroShunt device in the treatment of glaucoma: a modified Delphi Panel

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Purpose: Increased intraocular pressure (IOP) is a major and modifiable risk factor for the development and progression of primary open-angle glaucoma (POAG) [1]. The implantation of the PreserFlo™ MicroShunt (PMS) device has been shown to significantly lower IOP in patients with POAG [2, 3]. However, guidelines on best practice for patient selection and pre-/post-operative patient management are lacking. The aim of this modified Delphi Panel was to achieve expert consensus on the role of the PMS device to treat patients with glaucoma in Europe.

Methods: Twelve European glaucoma surgeons highly experienced with the PMS procedure participated in a three-round modified Delphi Panel [4]. A targeted literature review and expert steering committee guided Round 1 questionnaire development, containing patient selection and pre-/peri-/post-operative considerations. Consensus was set at a pre-defined threshold of ≥70% of participants selecting 'Strongly disagree'/'Disagree' or 'Strongly agree'/'Agree' for 6-point Likert-scale questions, or ≥70% selecting the same option for multiple-choice questions. Questions not reaching consensus were restated/revised for the next round, following guidance from freetext responses/scoping questions.

Results: 60.3% (n = 38/63), 60.0% (n = 18/30) and 100.0% (n = 11/11) of Likert/multiple-choice questions achieved consensus in Rounds 1, 2 and 3, respectively (Figure). There was agreement that the PMS procedure is effective at reducing IOP in patients with high-tension POAG (>21 mmHg). Although surgical techniques vary, consensus was reached on several points, including the importance of posterior application of Mitomycin C (MMC). Experts agreed that the PMS post-operative follow-up appointment schedule is reasonably predictable and typically characterised by fewer visits than trabeculectomy, particularly in the early phase. Participants agreed that although possible, further data are needed on the efficacy of combined cataract/PMS surgery and the use of non-MMC wound healing modulators/antifibrotics.

Conclusion: The expert consensus reached in this panel will help inform best practice guidelines in the treatment of patients with glaucoma in Europe. Experts also highlighted key areas for future research to improve understanding of the PMS device in the treatment algorithm of glaucoma.

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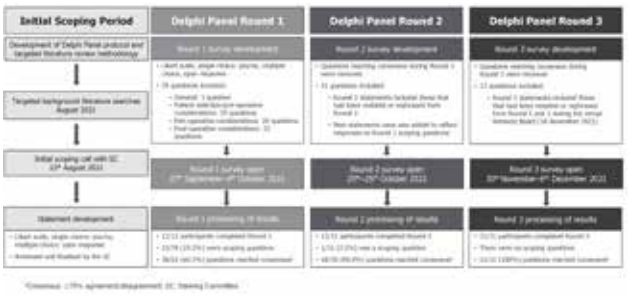

Figure 1. Delphi Panel study design.

P4.21
GLAUrious, a multicentre, randomised, controlled non-inferiority study of direct selective laser trabeculoplasty in open angle glaucoma

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Purpose: Effective first-line treatment of open-angle glaucoma (OAG) is currently limited by non-adherence to daily topical hypotensive medication and by lack of access to selective laser trabeculoplasty (SLT). A worldwide need exists for evidence-based, cost-effective, and widely accessible treatment options for OAG, with convenient administration to maximise adherence to treatment and improve long-term outcomes. Direct selective

laser trabeculoplasty (DSLT) is a novel, automated, non-contact procedure in which SLT-like laser beams are delivered to the limbus to reduce intraocular pressure (IOP) in patients with OAG, that can be administered within seconds, without the use of a gonioscope and the need for the specialised training required for traditional SLT. GLAUrious (NCT03750201) is a confirmatory clinical trial to assess the safety and efficacy of DSLT, compared with conventional SLT, in patients with OAG.

Methods: In this evaluator-masked, randomised, controlled, non-inferiority study, patients aged ≥ 40 years with ocular hypertension or OAG, including exfoliative or pigmentary glaucoma, and untreated/washout IOP 22-35 mmHg were recruited between November 2018 and April 2021 at 13 ophthalmology centres in the United Kingdom, Italy, Israel, and Republic of Georgia. Eligible patients were randomised 1:1 to DSLT or SLT. The primary outcome was between-group difference in mean IOP change from baseline to 6 months. Secondary 6-month outcomes were: proportion of patients with ≥20% reduction in unmedicated IOP from baseline; change in mean number of topical hypotensive medications from screening. Rates of adverse events in each treatment group were also evaluated.

Results: A total of 192 patients were randomised to receive treatment, 98 with DSLT and 94 with SLT. Baseline patient and eye characteristics were similar between treatment groups. Primary and secondary endpoints for non-inferiority of DSLT, compared with SLT, at 6-month follow-up will be presented.

Conclusions: Results of the GLAUrious study are expected to support use of DSLT as a widespread, convenient modality that can provide fast, effective laser treatment for OAG across a broad range of clinical settings. Given the prevalence of this debilitating condition, adoption of DSLT in global clinical practice has the potential to transform access to effective glaucoma treatment, preserving sight for millions of people worldwide.

P4.22
Combined excimer laser trabeculostomy and phacoemulsification: a multicenter real-word data study

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Purpose: To evaluate the efficacy and complication profile of Excimer Laser Trabeculostomy (ELT), an emerging laser-based trabecular MIGS, combined with cataract surgery in routine clinical practice.

Methods: Multiple-site, retrospective, interventional study. Preoperative and postoperative clinical data of patients with cataract in surgical stage under intraocular pressure (IOP) lowering medication treatment who underwent combined phacoemulsification and ELT were collected and analyzed at preoperative day and one day, 1, 3, 6, and 12 months after surgery. The main outcome measures were IOP and number of IOP lowering medications needed; glaucoma type, glaucomatous damage according to the Hodapp-Parrish-Anderson classification, best-corrected visual acuity (BCVA), complications and need of filtering surgery were recorded.

Results: 99 eyes were included, mean age was 70,3 years. The most common glaucoma diagnosis was primary open-angle glaucoma (68.4%) followed by secondary open-angle glaucoma (11.2%) and ocular hypertension (10.2%). 89,7% of eyes showed mild to moderate glaucoma damage and 70% were under ≥ 2 IOP lowering medications. The mean preoperative IOP under medications was 20.1 ± 3.8 mmHg (± standard deviation, SD) and decreased significantly at 1 year (16.7 ± 2.4; $p < 0.0001$). IOP was ≤ 20 mmHg in 88% of the eyes, ≤ 18 mmHg in a 60% and ≤ 15 mmHg in 18% at the end of follow-up. The mean number of IOP-lowering medications decreased from 1.8 ± 0.6 to 0.4 ± 0.7 ($p < 0.0001$) at the same period, and 78% of eyes were medication free. In those eyes with baseline non medicated IOP registered (n = 48) IOP mean reduction was 35% after one-year follow-up. Post-operative complications were two hyphema, one case of macular edema and 9 transient IOP spikes, all solved with topical medication. Rescue filtering surgery was needed for only two eyes.

Conclusion: Combining ELT with phacoemulsification in eyes with cataract and glaucoma reduced IOP and medication use without meaningful complications after one-year follow-up in a real-world clinical practice.

P4.23
Antimicrobial activity of topical ophthalmic anesthetics and topical ophthalmic antiseptics against microorganisms, received from the patients prior glaucoma filtrating surgery

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Infectious complications after glaucoma surgery are reported in 0.45-13.8% of cases and include mainly blebitis and endophthalmitis. The risk factors of such infectious complications are thin-walled avascular blebs (associated with antimetabolite use), bleb-leakage, inferior blebs, releasable sutures, filtering implants, conjunctivitis, blepharitis, episodic/continuous antibiotic use after the postoperative period, long term use of the topical solutions with preservatives, axial myopia, somatic infections, diabetes mellitus. The sources of bacteria are usually ocular flora. The most common causative organisms are *Staphylococcus spp, Streptococcus spp, Corynebacterium spp, Enterococcus spp* and *Haemophilus influenzae*.

Purpose: As topical anesthetics have been demonstrated antibacterial effects, the aim of the research was to study the minimum inhibitory concentration (MIC) of topical anesthetics (proparacaine 0.5%, lidocaine 2.0%) and antiseptics (povidone-iodine 5.0%, decametoxine 0.02%, chlorhexidine gluconate 0.02%) against clinical strains of the microorganisms.

Methods: Clinical strains of the microorganisms were received from the smear of the conjunctiva of the patients before glaucoma surgical procedures. MIC values of topical anesthetics and antiseptics were determined to the clinical isolates using serial double dilutions technique.

Results: 32 clinical strains were isolated from 46 patient and identified (*S.aureus* - 18, *S.epidermidis* - 14). Proparacaine 0.5% had MICs of 2187.50 ± 104.17 μ/ml for *S.aureus* and 2953.50 ± 112.54μ/ml for *S.epidermidis*. Lidocaine 2.0% had MICs of 4910.71 ± 505.95μ/ml for *S.aureus* and 5345.62 ± 487.54 μ/ml for *S.epidermidis*. Povidone-iodine 5.0% was active against S.aureus and S.epidermidis in MICs 916.67 ± 52.93 μ/ml and 994.67 ± 49.81 μ/ml respectively. Quaternary ammonium

compound antiseptic decametoxine 0.02% had MICs of 2.53 ± 0.26 µ/ml for *S.aureus* and 2.87 ± 0.31 µ/ml for *S.epidermidis*. Chlorhexidine gluconate 0.02% had MICs of 6.02 ± 0.56µ/ml and 6.23 ± 0.52µ/ml for *S.aureus* and *S.epidermidis* respectively.

Conclusion: Both local anesthetic solutions proparacaine and lidocaine possess antimicrobial activity in MICs, which are lower than in povidone-iodine. Quaternary ammonium compound antiseptics decametoxine and chlorhexidine gluconate showed high antimicrobial effectiveness against *S.aureus* and *S.epidermidis* as the most coomon pathogenes causing infectious complications after glaucoma surgery. All tested anesthetics and antiseptics inhibited growth of *S.aureus* and *S.epidermidis* at commercially available concentrations. Further studies of the combined antimicrobial efficacy of antiseptics and anesthetics are promising for improving the prevention of infectious complications in ophthalmic microsurgery.

P4.24
Postoperative pain after different transscleral laser cyclophotocoagulation procedures

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Purpose: To compare postoperative pain levels of two different transscleral cyclophotocoagulation procedures.

Methods: Retrospective evaluation of patients treated with continuous wave diode transscleral cyclophotocoagulation or micropulse transscleral cyclophotocoagulation at the Medical University of Graz between 2018 and 2020. Postoperative pain was documented on the day of the procedure and on the first postoperative day and pain intensity was assessed by numeric rating scale ranging from 0 (no pain) to 10 (worst pain imaginable).

Results: 245 patients were included. Of 145 patients treated with continuous wave diode transsceral cyclophotocoagulation 32 (22.1%) had notable postoperative pain and of 100 patients treated with micropulse transscleral cyclophotocoagulation 13 (13%) indicated pain after the procedure ($p = 0.023$). In the patients who complained about pain no difference in pain levels documented by numeric rating scale was found between the different laser methods (4.40 ± 1.26 vs. 4.65 ± 1.23, $p = 0.577$). Intraocular pressures were comparable preoperatively (34.87 ± 12.49 mmHg vs. 33.62 ± 12.49 mmHg, $p = 0.425$) and on first postoperative day (22.63 ± 10.06 mmHg vs. 24.36 ± 9.20, $p = 0.240$).

Conclusion: Micropulse transscleral cyclophotocoagulation led to less postoperative pain compared to continuous wave diode transscleral cyclophotocoagulation.

P4.25
Sutureless deep sclerectomy with fibrin sealant (Tisseel) - preliminary outcomes

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Purpose: To evaluate the efficacy and safety of modified deep sclerectomy (mDS) in which the conjunctiva and scleral flap were closed with Tisseel fibrin glue (Baxter Czech spol. s.r.o., Prague, Czech Republic), instead of with classic sutures.

Methods: We investigated 11 eyes of 11 patients with open-angle glaucoma who underwent mDS with implantation of Esnoper Clip (6 eyes, 6 patients) and Esnoper V2000 (5 eyes, 5 patients) between February and September 2021. Of these, 1 patient (Esnoper Clip) was excluded from the statistical analysis due to the suture-adaptation of the scleral flap, while Tisseel glue was used only on the conjunctiva. The mean age of all patients was 63.4 ± 15.3 (39-87). We evaluated: IOP reduction, intraoperative and postoperative complications.

Results: Preoperative IOP was 26.6 ± 10.2 mmHg and significantly decreased upon follow-up ($p < 0.01$). After surgery, IOP was: at 1 day 7.9 ± 4.5 mmHg, at 1 week 9.6 ± 5.7 mmHg, at 1 month 17.6 ± 7.3 mmHg, at 3 months 13.0 ± 2.4 mmHg and at 6 months 16.3 ± 4.9 mmHg. The mean number of glaucoma medications preoperatively was 3.4 ± 1.0 and significantly decreased to 1.0 ± 1.4 in the sixth postoperative month ($p < 0.01$). YAG goniopuncture was performed in 2 eyes between the 1st and 6th months postoperatively when the IOP target was not reached. No significant changes in visual acuity were registered postoperatively. In terms of complications, we noticed perioperatively a trabeculo-descemet microperforation in one patient. Further, we noted in 3 eyes a transient hypotony for about 1-2 weeks postoperatively and in 2 eyes mild hyphema. No conjunctival dehiscence or anterior chamber swallowing or choroidal detachment was detected postoperatively.

Conclusion: Based on our results, mDS using a fibrin sealant is a promising modification of the classic procedure. The surgery was followed by a relatively low number of complications in our patients and provided relatively safe wound healing. Despite the promising results, further and more comprehensive research is needed to expand the fibrin glue wound adaptation in place of conventional sutures in standard practice.

P4.26
The eyePlate-300 implant: results in refractory glaucoma

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Purpose: The eyePlate glaucoma drainage implant (eyePlate, Rheon Medical SA) is a novel non-valved drainage device constructed entirely out of medical grade silicone. This study evaluates the 6-month efficacy and safety of the eyePlate-300 implant in cases of uncontrolled glaucoma. To our knowledge this is the first report of this novel glaucoma drainage implant device.

Methods: A retrospective, non-comparative study of 16 consecutive eyes treated with the eyePlate-300 glaucoma drainage implant at the Western Eye Hospital, London between

March 2020 and April 2021 was performed. The patients were followed up for 6 months. For all patients, care was overseen by the same glaucoma consultant who performed all the surgeries under local anaesthesia. The Kolmogorov-Smirnov and Shapiro-Wilk tests established normality of results. The paired t-test was used to assess statistical significance of the results.

Results: A total of 15 patients (16 eyes) were included. The mean age was 59.7 (±15.8) years. The most common diagnosis was primary open angle glaucoma (37.5%). Previous procedures included trabeculectomy (31.25%), micropulse diode laser trabeculoplasty (56.25%), iStent (12.5%) and cyclodiode laser (12.5%). Mean pre-treatment IOP was 31.5 (±9.9) mmHg. There was a significant reduction ($p < 0.05$) in IOP at 1 month to 11.8 (±4.2) mmHg (62.6% reduction), at 3 months to 16.25 (±2.3) mmHg (51.6% reduction) and at 6 months to 15.4 (±2.2) mmHg (51.1% reduction). The requirement of topical treatment significantly reduced ($p < 0.0.5$) from a baseline of 3.44 (±1.09), to 2.06 (±0.42) at 1 month, 2.0 (±0.47) at 3 months and 2 (±0.46) at 6 months. There was no statistically significant drop in visual acuity or increase in central retinal thickness found. Two patients (12.5%) experienced prolonged uveitis requiring extended steroid treatment for resolution. Three patients (18.75%) had post-op hypotony with choroidal effusions but showed an improved VA at 6 months. None of the patients required any further surgery.

Conclusion: The above results have shown the eyePlate-300 to be significantly effective in reducing IOP and need for topical treatment in patients with refractory glaucoma within a 6-month period following surgery. Further long-term data is needed to confirm efficacy and comparability to current commonly used procedures.

P4.27
Analysis of a series of patients who underwent PAUL glaucoma implant surgery and removal of the tutor before the third postoperative month

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Purpose: To report the feasibility and safety of 6/0 Prolene intraluminal tutor removal before the third postoperative month in glaucoma patients who underwent PAUL glaucoma implant (PGI) surgery.

Methods: This is a retrospective case series of patients who underwent PGI surgery associated with 5-FU as a wound modulator, combined with an intraluminal 6/0 Prolene tutor. The tutor removal was based on clinical follow-up features. The global population included 23 eyes of which 13 met the condition of having a follow-up of at least 3 months and having the tutor removed. Of the 10 discarded eyes, 2 lacked some postoperative data and 8 still kept the tutor and did not achieve a follow-up of at least 3 months at the time of analysis. Follow-ups were performed at 1st postoperative day, 1 week, 1 month and 3 months. The main objective was to determine the presence of complications derived from this maneuver. Preoperative and postoperative data included demographic aspects, IOP, mean number of anti-glaucoma drugs and time until stent removal.

Results: 13 eyes were selected, of which, one was excluded from the analysis because of tube erosion. An average decrease in IOP of 10.50 mmHg (4.18-16.81) IC95% was seen between preoperative IOP and that of the 3rd month ($p = 0.004$). Tutor removal time ranged around 45.91 ± 15.44 days after surgery. One patient presented an episode of hypotonia after removal of the tutor at 38 days which required reformation of the anterior chamber and tube ligation. No other complications were observed. Mean reduction in the number of medications was 1.75 ± 1.48 ($p = 0.011$), and a total of 7 patients did not require any postoperative anti-glaucoma drug.

Conclusion: In our study, we observed that removal of the tutor between the second and third postoperative month was an effective and safe maneuver. There are series in which tutor withdrawal is recommended after the third month, but Mitomycin C is used instead of 5-FU. Minimal but substantial aqueous humor percolation along the partially obstructed tube helps maintaining postoperative IOP in safe levels even without the aid of additional medication in many cases.

P4.28
Usefulness of guided implantation of Ahmed glaucoma valve

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Purpose: To compare usefulness of guided verses non-guided implantation of Ahmed glaucoma valve using 4-0 nylon guide and spatula in terms of reducing corneal decompensation.

Methods: This is a retrospective study including patients who underwent Ahmed glaucoma valve (AGV) implantation in Ulsan national university performed by a single surgeon from 2016 to 2021. They were divided into two groups: guided implantation group (gAGV) and non-guided implantation group (ngAGV). Preoperative and postoperative endothelial cell density (ECD) were measured using specular microscopy and frequency of tube repositioning operation within 2 years was investigated.

Results: This study includes 27 eyes from 27 patients in gAGV, and 74 eyes from 69 patients in ngAGV, with tube placed in the anterior chamber. Mean preoperative ECDs were 2036 ± 37 cells/mm^2 in gAGV and 2076 ± 72 cells/mm^2 in ngAGV. Postoperative ECD loss percentages were 6.21 ± 15.44% and 22.14 ± 23.50% ($p = 0.003$), and postoperative monthly ECD loss percentages were 0.56 ± 1.57% and 1.49 ± 1.93% ($p = 0.046$) in gAGV and ngAGV, respectively. Tube reposition was performed if there was an increased risk of corneal decompensation, and the repositioning frequency was 0% in gAGV and 5.14% in ngAGV ($p = 0.105$).

Conclusion: Guided Implantation of AGV is a safe and easy adjuvant surgical technique which is effective in reducing ECD loss and frequency of tube repositioning operation compared to conventional non-guided implantation technique.

P4.29
Real world efficacy and safety of XEN45 secondary bleb needling

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Purpose: To report 'real world' efficacy and safety measures for XEN bleb needling in a National Health Service setting.

Methods: Retrospective audit of electronic records of patients who had undergone a XEN bleb needling procedure between 5/2015-01/2021. Visual acuity before and after needling, needling rate, number of needlings, needling setting, antimetabolite use and time to needling were recorded as well as demographic charachteristics. Statistical analysis was performed using SPSS software. The main outcome measure was intraocular pressure (IOP) reduction. Success was defined as a reduction of IOP for three thresholds (21,18,15 mmHg). A subgroup analysis was performed for needling rate, number of needlings, setting (operating room or slit lamp in a clinic), antimetabolite agents (5-flurouracil or mitomycin-C) and time to needling

Results: 417 eyes underwent an ab-interno XEN implantation between 6/2015-12/2020. Subsequently, we included 219 bleb needlings on 155 eyes (37%). Mean time of follow up from the first needling was 19.2 ± 15.9 months. Mean pre-needling intraocular pressure was 24.9 ± 7.3 mmHg, thereafter, reduced to 17.3 ± 8 at the end of follow up. Success rates of intraocular pressure ≤ 21,≤ 18, ≤ 15 were 70.8%, 61.6% and 43.4%, respectively. Needling rate, number of needlings, setting, antimetabolite agent and time to needling did not significantly influence efficacy or safety. No significant adverse events were noted.

Conclusion: XEN bleb needling is a viable, effective and safe procedure, irrespective of rate, setting, antimetabolite or time to needling. Needling should be applied according to the surgeon's expertise. Patients should be advised as to the success rates and expected intraocular pressure reduction.

P4.30
Evaluation of selective laser trabeculoplasty effectiveness in patients with ocular hypertension and open-angle glaucoma

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Purpose: To evaluate the effectiveness of selective laser trabeculoplasty (SLT) in patients with open-angle glaucoma and ocular hypertension.

Methods: Retrospective analysis of patients, who treated by SLT in the first half 2021, was performed in private clinic «Naykrashchyy Zir», Rivne, Ukraine and «Top Medical», Zaporizhzhia, Ukraine. The SLT results of 174 eyes (102 patients): 106 eyes (61%) with open-angle glaucoma and 68 eyes (39%) with ocular hypertension were analyzed. The efficacy of SLT was assessed by the IOP level before SLT, after 1 month, after 2 months, after 6 months, using the perimetric MD index. The criterion of complete success was target IOP achievement and IOP-lowering efficacy of ≥ 20% from baseline without any additional interventions. Only patients with complete medical records at half-year follow-up visits were enrolled in this study.

Results: Mean intraocular pressure (IOP) before laser treatment was 28.04 ± 3.07 mmHg. After 1-month follow-up, mean IOP was 17.42 ± 2.54 mmHg ($p < 0.01$). Overall an IOP-lowering efficacy of ≥ 20% from baseline was noted in 125 eyes (72 %) at 2 months and in 113 eyes (65 %) at 6 months. SLT retreatment was performed in 15 eyes (9%). Noncomplete IOP control with necessity of additional interventions was elicited in 8 eyes (5 %): transscleral cyclophotocoagulation (n = 4) and trabeculectomy (n = 4).

Conclusion: SLT is effective and safe method of IOP compensation. In majority of cases, target IOP was achieved and evidenced with stabilization of retinal sensitivity by standard automated perimetry. Our study also notes the necessity of a regular follow-up of these patient cohorts.

P4.31
The management of neovascular glaucoma: a systematic review and meta analysis of randomised controlled trials

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Purpose: Neovascular glaucoma (NVG) is a form of secondary glaucoma characterised by elevated intraocular pressure (IOP) and neovascularisation of the angle, culminating in progressive optic neuropathy and subsequent vision loss. Treatment aims to reduce and control IOP in order to prevent optic nerve damage. A systematic review was completed synthesizing results from randomised control trials (RCTs) comparing interventions for the management of NVG and their efficacy and safety.

Methods: Data was sourced from Web of Science, Embase and Medline between the dates 1st January 2000 and 31st December 2021. The primary outcome measures were mean IOP at follow-up and success rate. The secondary outcomes included mean IOP lowering medications and total complications. Risk of bias was assessed with the Cochrane ROB 2.0 tool. A meta-analysis was completed on comparative studies using Revman (version 5.4).

Results: A total of 14 RCTs were included in this systematic review which included 687 patients (690 eyes) with a mean age of 60.5 ± 7.3 years and a mean follow-up of 15.2 ± 9 months. Two studies comparing the Ahmed glaucoma valve (AGV) and pan-retinal photocoagulation (PRP) against AGV + PRP + intravitreal bevacizumab (IVB) underwent a meta-analysis, which showed no difference in mean IOP or odds of success. Other findings were a significantly lower mean IOP at 1 ($p = 0.002$) and 3 months ($p = 0.033$) for IVB vs sham injection. There was also a significantly lower mean IOP at 6 ($p = 0.001$), 9 ($p = 0.01$), 12 ($p = 0.02$) and 18 months ($p = 0.004$) for intra-vitreal ranibizumab (IVR) + PRP + visco-trabeculectomy vs IVR + PRP + trabeculectomy and a significantly lower mean IOP in the Baerveldt group vs trabeculectomy at 6 months ($p = 0.03$). Furthermore, a significantly lower mean IOP at 1 month ($p = 0.01$) in the AGV + triamcinolone (TCA) group was reported vs AGV.

Conclusion: This is the first meta-analysis of RCTs in the management of neovascular glaucoma. The lack of high-quality evidence contributes to the lack of consensus in managing NVG. Our results highlight modern treatment strategies and the need for better powered RCTs with long-term follow-up in order to establish optimal treatment modalities and true patient outcomes.

P4.32
Micropulse trans-scleral cyclophotocoagulation (MPTCP) versus continuous wave trans-scleral cyclophotocoagulation (TCP) in eyes with glaucoma - the Diode in Glaucoma Study (DIGS)

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Purpose: Continuous wave trans-scleral cyclophotocoagulation (TCP) is often used in eyes with glaucoma refractory to medical treatment but may be associated with sight-threatening complications. Micropulse TCP (MPTCP) is increasingly used in its stead in recent times, due its theoretically more selective and less destructive nature. There is no large-scale study to-date comparing MPTCP and TCP for all types of glaucoma. In this study, we compare the 3-year post-operative outcomes of MPTCP and TCP in eyes with glaucoma.

Methods: A retrospective cohort study was performed of 124 glaucomatous eyes that underwent MPTCP (n = 73) and TCP (n = 51). Success was defined as a post-operative intra-ocular pressure (IOP) between 6 and 21 mmHg or at least a 20% reduction of IOP from the baseline without the use of oral hypotensive agents post-operatively and no new loss of central vision, or phthisis within the follow-up period.

Results: Both groups had a similar mean patient age of around 63 years and gender ratio – two-thirds male ($p > 0.05$). The TCP group included more eyes with neovascular glaucoma (41.2% vs 9.6%) and less eyes with primary open angle glaucoma (9.8% vs 27.4%) ($p < 0.05$). The TCP group had poorer preoperative best corrected visual acuity (logMAR VA) (2.8 vs 1.4), higher mean pre-operative IOP (35.7 vs 26.3 mmHg) and higher use of pre-operative oral hypotensive agents (49% versus 30.1%) ($p < 0.05$). Comparing the TCP group with the MPTCP group at 3 years post-operatively, the mean IOP was 19.0 mmHg vs 19.2 mmHg ($p = 0.95$), mean number of hypotensive topical medications required were 2.3 vs 3.1 ($p = 0.07$), complication rates were 35.8% vs 9.6% ($p < 0.05$) and failure rates were 45.1% vs 40.3% ($p = 0.42$). Nearly 25% of eyes lost VA > 2 Snellen lines in both groups ($p = 0.61$). More MPTCP eyes required repeat treatment compared to the TCP group (31.5% vs 21.6%) but this was not statistically significant. Success rates were found to be similar in both groups regardless of the baseline VA.

Conclusion: MPTCP is a good alternative to TCP in glaucomatous eyes requiring cycloablation with equivalent success rates and reduced complication rates but may require higher number of post-operative hypotensive agents and repeat treatments.

P4.33
Impact of PreserFlo® MicroShunt on the corneal endothelial cells

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Purpose: Minimally invasive glaucoma surgery has gained importance in glaucoma therapy in recent years. The PreserFlo® MicroShunt is one of the newer implants draining aqueous humour into the subconjunctival space and is very effective in lowering intraocular pressure (IOP). Possible side effects of the PreserFlo MicroShunt on the corneal endothelium are widely unknown.

Methods: This prospective study included 22 eyes of 21 patients with glaucoma who underwent PreserFlo® MicroShunt implantation between October 2020 and July 2021. Informed consent was obtained before inclusion. Best corrected visual acuity (BCVA), IOP, endothelial cell density and number of IOP lowering drugs were measured preoperatively, three and six months after surgery. Also, the rate and time points of postoperative bleb revision (needling) were analyzed. Non-operated patients' fellow eyes served as a control group for endothelial cell loss throughout the study.

Results: Mean preoperative IOP (29.14 ± 8.54) was highly significantly reduced 3 months (14.74 ± 6.27; $p < 0.001$) and 6 months (14.62 ± 4.42; $p < 0.001$) after surgery. The BCVA was not significantly altered after 6 months (preoperative: 0.25 ± 0.21 logMAR; 6 months: 0.19 ± 0.27 logMAR; $p = 0.26$). The endothelial cell density of the operated eyes (preoperative: 2227.71 ± 854.57 cells/mm²) did not change significantly after 3 (2081.64 ± 506.32 cells/mm²; $p = 0.61$) or 6 months (2127.81 ± 404.57; $p = 0.1$) postoperatively. No alterations of endothelial cell density were observed in the control group (preoperative: 2150.18 ± 352.47 cells/mm²) after 3 months (2151.86 ± 474.73 cells/mm²; $p = 0.98$) or 6 months (2155.47 ± 413.15 cells/mm²; $p = 0.95$). The number of IOP lowering medication decreased significantly in the operated eyes from 3.0 ± 1.05 preoperatively to 0.19 ± 0.68 ($p < 0.001$). On average, 0.76 ± 1.26 bleb revisions were required in 31.8 % of patients with an average time to first needling of 4.27 ± 2.51 months.

Conclusion: PreserFlo® MicroShunt implantation is a safe and effective therapeutic option in glaucoma and does not seem to harm the corneal endothelial cells in the first 6 postoperative months. Longer observation periods will be examined in following studies.

P4.34
Reoperations for complications after gel stent implantation or trabeculectomy

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Purpose: To describe reoperations in the operating room for complications that occurred after gel stent implantation or trabeculectomy at a single institution over five years.

Methods: A retrospective chart review of adult patients who have undergone gel stent implantation with mitomycin C (MMC) or trabeculectomy with MMC at Clinica Oculistica, Genoa, Italy, was performed. Postoperative complications that required reoperations within the first 90 days or later were evaluated.

Results: A total of 351 surgeries were performed on 318 patients. Of these, 232 (66%) were gel stent implantation, and 119 (34%) were trabeculectomy. Combined phacoemulsification was performed in 52/232 (22.4%) of eyes in the gel stent group and 8/119 (6.7%) of eyes in the trabeculectomy group ($p < 0.01$). Overall reoperation rate was 67/351 (19%), including 44/232 (19.0%) in the gel stent group and 23/119 (19.3%) in the trabeculectomy group (p = n.s). Within 90 days, reoperations took place in 5/232 (2.2%) in the gel stent group and 8/119 (6.7%) in the trabeculectomy group ($p = 0.03$). After 90 days,

reoperations took place in 39/232 (16.8%) in the gel stent group and 15/119 (12.6%) in the trabeculectomy group (p = 0.30). Major causes of early reoperations were overfiltration for the trabeculectomy group and bleb scarring for xen group. For both procedures, bleb scarring was the major cause of late reoperation.

Conclusion: The rates of reoperation for postoperative complications after gel stent or trabeculectomy was comparable with previous studies. A higher number of reoperations within 90 days was observed in the trabeculectomy group than the gel stent group despite the more significant number of combined procedures in the latter group. A slightly higher number of late reoperations was observed in the xen group.

P4.35
Efficacy and safety of application of MMC 0.4 mg/mL for 5 minutes with PreserFlo MicroShunt

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Purpose: Optimal dose and duration of mitomycin C (MMC) at the time of PreserFlo MicroShunt surgery is debated. While use of high strength MMC with trabeculectomy may ameliorate fibrosis, significant risks of long term hypotony and anterior avascular bleb formation exist. The MicroShunt may circumvent these risks by means of an integrated flow restrictor (reducing the risk of hypotony) and a long tube (8.5 mm) creating a posterior bleb. We hypothesize that a high dose and long duration of MMC with the MicroShunt may be an optimal means of reducing fibrosis while avoiding the complications mentioned above. The purpose of this study is to report the efficacy and safety of MicroShunt implantation with MMC 0.4 mg/mL for 5 minutes to a follow-up time of 1 year.

Methods: We performed a retrospective, interventional case series of consecutive patients receiving the MicroShunt with MMC 0.4 mg/mL for 5 minutes. The primary outcome measure was the proportion of eyes achieving complete success at 1 year, defined as IOP of less than 21 mmHg or more than 20% reduction below preoperative IOP, with no glaucoma medications. Additional outcomes recorded were mean IOP, number of medications, as well as complications and reoperations.

Results: 35 eyes from 33 patients were included in the analysis. The mean age was 70 years and 54% were female. Mean preoperative IOP was 23.3 mmHg and the mean number of glaucoma drops was 3.4. 54.5% achieved complete success and 81.8% achieved overall success (with or without medications). Mean IOP at 1 year postoperative was 12.97 mmHg, a significant reduction from baseline ($p < 0.0001$); mean number of drops also decreased significantly to 0.77 ($p < 0.0001$). Median BCVA was not significantly different at 1 year compared to preoperative. 4 eyes had early surgical complications requiring reoperation for MicroShunt obstruction. 2 eyes developed temporary hypotony-related choroidal detachments which resolved spontaneously.

Conclusion: The MicroShunt with MMC 0.4 mg/mL for 5 minutes effectively lowered IOP while maintaining a safety profile comparable to other major studies in the literature. Mean IOP at 1 year with this MMC protocol may be lower than comparable studies using lower strength MMC.

P4.36
Differences in outcomes of ab externo trabeculectomy performed by residents versus assistants

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Purpose: To compare outcomes of ab externo trabeculectomy between residents and assistants.

Methods: A retrospective study including all consecutive eyes submitted to ab externo trabeculectomy in a tertiary center from January 2017 to June 2020. Patients under 18 years old were excluded. Data collected included patients' age and gender, glaucoma type, systemic and ocular comorbidities, lens status, type of surgeon, and if the procedure was combined with phacoemulsification. Best-corrected distance visual acuity (BCVA, logMAR), intraocular pressure (IOP), and number of different classes of hypotensive drops required before surgery and during follow-up were compiled, as well as intra and postoperative complications and subsequent interventions. Postoperative procedures such as bleb needling, tube shunt implantation and laser cyclophotocoagulation were considered as reinterventions.

Results: 68 eyes from 63 patients (43,6% female) were included. Mean age at surgery was 64,75 ± 15,06 years. Mean follow-up time was 33,05 ± 14,98 months. The most common type of glaucoma was primary open-angle glaucoma (48,5%, n = 33), followed by pseudoexfoliative glaucoma (29,4%, n = 20). 29,4% (n = 20) of the eyes were phakic and 7,4% (n = 5) had previous glaucoma surgery. There were no significant pre-operative differences between groups, namely regarding IOP or glaucoma type. 14,7% (n = 10) of the trabeculectomies performed were combined with phacoemulsification. 19,1% (n = 13) of the procedures were performed by residents. No relevant intraoperative complications were described in either the residents or assistants' groups. IOP at 3-, 6- and 12-months after surgery was significantly higher in the resident's group (17,31 vs 12,92 mmHg, p = 0,014; 17,33 vs 11,35 mmHg, p = 0,010; 15,15 vs 12,04, p = 0,037, respectively). The most common postoperative complications were bleb leak (33,8%, n = 23), tight scleral flap sutures and cataract (both 19,1%, n = 13), choroidal detachment (16,2%, n = 11) and encapsulated bleb (10,3%, n = 7), with no significant differences between residents and assistants (p > 0,05). Reintervention rate was higher in the residents' group (38,5%, n = 5 vs 10,9%, n = 6, p = 0,029).

Conclusion: To our knowledge, this is the first European study comparing the outcome of ab externo trabeculectomy performed by resident trainees and staff surgeons. We report significantly higher postoperative IOPs at 3-, 6- and 12-months and higher reintervention rates in the residents' group.

P4.37
Modified technique of Ex-PRESS filtration device combined with a scleral pocket for severe open angle glaucoma: the experience of a tertiary center

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Purpose: To analyze the efficacy and safety of a modified technique of Ex-PRESS filtration device in the management of severe primary and secondary open angle glaucoma.

Methods: Patients submitted to a modified Ex-PRESS implant technique in our department in the past 5 years were included. This technique consists in the creation of a small pocket in the sclera, just behind the drainage hole of the Ex-PRESS implant. The efficacy outcomes included intraocular pressure (IOP) evaluation and number of hypotensive drugs. IOP was analyzed at baseline, 1st day, 1st week, 1st, 3rd, 6th and 12th months after surgery. The number of hypotensive drugs was analyzed at baseline, 6th and 12th months. As safety outcomes, all surgical complications were recorded. The minimum follow-up was 6 months.

Results: 37 eyes were included with a median follow-up of 12 months [6;60]. Mean age was 56.3 ± 14.7 years-old. Secondary open angle glaucoma due to hereditary transthyretin Amyloidosis (ATTR) was the most frequent (23 eyes, 62.2%), followed by primary open angle glaucoma (7 eyes, 18.9%). IOP significantly decreased from baseline (28.1 ± 5.9 mmHg) to 7.5 ± 7.1 mmHg at 1st day, 8.6 ± 8.1 mmHg at 1st week, 11.6 ± 7.2 mmHg, 13.3 ± 7.2 mmHg, 12.9 ± 6.1 mmHg and 11.3 ± 2.4 mmHg at 1st, 3rd, 6th months and 1 year after surgery, respectively ($p < 0.001$). The number of antiglaucoma medications also decreased significantly from baseline (3.6 ± 0.8) to 0.6 ± 0.9 and 0.4 ± 0.5 at 6 and 12 months, respectively ($p < 0.001$). Eight eyes (21.6%%) experienced post-surgical complications: one vitreous hemorrhage (2.7%) in an hypocoagulated patient, seven eyes (18.9%) had hypotony in the immediate post-operative period, but all cases were solved with conservative treatment. Four eyes (10.8%) needed an additional surgery: 3 patients (8.1%) with ATTR secondary glaucoma underwent an Ahmed Valve implantation and one patient had a superficialized implant three years later.

Conclusion: At our department, this technique has been used mostly in ATTR secondary glaucoma. Those are generally cases of rapidly progressive glaucoma, whose treatment needs to be aggressive. This Ex-PRESS modified procedure has shown to be effective in IOP reduction on severe cases of refractory glaucoma. Although some complications have been reported, they were mostly managed in a conservative way.

P4.38
Intraoperative downsizing of the Baerveldt implant plate in elderly patients with short eyes

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Purpose: Older age and short axial length have been reported to be risk factors for hypotony and suprachoroidal hemorrhage after glaucoma surgery. The larger glaucoma drainage implant plate size may lead greater degree of IOP reduction, and more surgical complications, especially in elderly patients with short eyes. The aim of this study was to evaluate the efficacy and safety of Baerveldt implant plate size reduction in glaucoma patients (80 years and older) with short axial length of the eye (under 22 mm).

Methods: A retrospective review was conducted of 24 eyes of 24 consecutive patients with Baerveldt 250-mm^2 implantation between 2014 and 2021. All implants underwent truncation of both wings of the device by using scissors. Surgical success was defined as IOP < 21 mmHg with at least a 30% reduction in IOP from baseline, IOP > 5 mmHg, and neither reoperation of glaucoma nor loss of light perception vision. The mean age was 83.0 ± 2.9 years (80-89 years) with mean follow-up of 29.8 ± 14.0 months (12-72 months).

Results: The mean ± SD baseline intraocular pressure (IOP) was 30.2 ± 6.9 mmHg (range 20- 54) and the mean IOP at the last follow-up visit was 13.3 ± 5.1 mmHg (range 3-22) ($p < 0.001$). The number of antiglaucoma medications declined from mean 3.7 ± 1.0 preoperatively (range 2-5) to 1.6 ± 1.1 at the last visit (range 0-3). Mean IOP was 14.9 ± 5.4 mmHg (range 3-28) at 6 months, and 14.6 ± 5.4 mmHg (range 3-26) at 1 year. The success rate at the last visit was 79% (19 of 24 eyes). Complications included intraoperative suprachoroidal hemorrhage (later phthisis bulbi) in one eye, and hyphema in two eyes.

Conclusion: The Baerveldt implant plate size reduction seems to be an effective and safe treatment for difficult glaucoma in elderly people with short eyes.

P4.39
A simple surgical solution for the treatment of persistent postoperative hypotony after PreserFlo MicroShunt implantation

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Purpose: PreserFlo MicroShunt (PMS) implantation is a relatively new and increasingly popular treatment for recalcitrant glaucoma. Though relatively uncommon, persistent, or severe postoperative hypotony may occur and its treatment presents a significant challenge. We present a surgical technique for management of post-operative hypotony after PMS implantation.

Methods: Interventional case series of 7 patients who underwent the insertion of a 9-0 prolene intraluminal stent to treat severe or persistent postoperative hypotony.

Results: Mean follow-up (SD) was 278 (143) days. Mean intraocular pressure (IOP) (SD) pre-stenting was 6.3 (4.2) mmHg. Mean post-operative IOP (SD) at 1 day, 1 week, 2 weeks, 3 weeks and last follow-up was: 12.6 (4.9) mmHg, 12.4 (5.4) mmHg, 13.25 (6.2) mmHg, 10.8 (7.6) mmHg and 11.4 (5.5) mmHg, unmedicated. 3 patients required removal of the intraluminal stent during the period of follow-up. Time to stenting ranged from 2 to 8 weeks after PMS insertion. Mean visual acuity (SD) logMAR pre-stenting was 1.02 (0.93), improving to 0.5 (1.01) at the time of symptom resolution and 0.5 (1.03) at last follow-up. The procedure was considered successful in 6 out of 7 patients. One case suffered a severe supra-choroidal haemorrhage as a result of hypotony, with poor visual recovery, and limited follow-up, so success was difficult to assess.

Conclusion: Stenting the PreserFlo MicroShunt can be a successful way to treat persistent postoperative hypotony, avoiding surgical failure.

P4.40
Dilated, atonic pupil after micropulse transscleral laser treatment

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Purpose: Cycloablative procedures may be advocated to treat patients with refractory glaucoma unable to undergo alternative treatment modalities. Continuous-wave transscleral cyclophotocoagulation (TSCPC) utilizes laser energy targeted at the ciliary body, leading to disruptive coagulative tissue changes decreasing aqueous humor production. It has been suggested that in contrast to continuous-wave TSCPC more novel therapeutic techniques, such as Micropulse transscleral laser treatment (MP-TLT) cause less damage to the surrounding tissues while reducing intraocular pressure (IOP) to a clinically favorable level.

Methods: We performed detailed pre- and postinterventional examinations including pupilometry, anterior segment color and infrared photographs as well as anterior segment OCTs.

Results: Between January 2019 and September 2020 at our unit we treated 244 eyes with MP-TLT. No case of postoperative phthisis was recorded, but at least one case of prolonged anterior uveitis. We describe five cases of a fixed dilated pupil following MP-TLT in detail.

Conclusion: In contrast to continuous-wave TSCPC, rates of complications from MP-TLT are thought to be lower with less pain and inflammatory reaction. However, the mechanism of MP-TLT is not yet fully accepted. While some authors do not confirm visible morphological changes others do. Tissue may respond without visible changes caused by biological stress. MP-TLT may also modulate the production of inflammatory mediators. We consider the mechanism of pupil dilatation to be via damage to autonomic nerves from thermal or other laser damage. If this is correct, a corollary is that the lowest effective laser settings should be used for the least time. If probe movement is too slow, that would also allow a potentially damaging thermal build up. Newer iterations of MP-TLT probe design and treatment parameters aim at optimizing tissue coupling, energy dissipation and consistent treatment application reducing collateral effects. Clinicians should be aware of the potential postoperative complication of fixed dilated pupils and take steps to avoid it.

P4.41
Is trabeculectomy associated with an improvement in circumpapillary RNFL or macular GCIPL thickness?

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Purpose: Ophthalmologists commonly perform glaucoma surgery to treat progressive glaucoma. Few studies have examined circumpapillary RNFL (circumpapillary retinal nerve fibre layer) and macular GCIPL (ganglion cell inner plexiform layer) thickness along with MD (mean deviation) on visual field changes in eyes post trabeculectomy?

Methods: 58 eyes of 58 patients undergoing MMC augmented trabeculectomy over 12 months and at least 18 months postoperatively were assessed.

Results: Average age of patients was 69.8 ± 12.4, 57.9% were female, peak IOP (mmHG) pre operative was 25.6 ± 7.7 mmHg, peak IOP post operative was 9.9 ± 3.1. On visual field, pre operative MD (dB) was -12.9 ± 6.9, and post operative MD (dB) was -12.1 ± 7.0 (-11.3, -16.4 to -7.0). The pre operative cpRNFL (um) was 56.9 ± 13.5 and the post operative cpRNFL was 56.4 ± 12.6. The pre operative mGCIPL (um) was 71.8 ± 10.3 while the post operative mGCIPL was 70.4 ± 9.8. Overall, there was no significant difference in cpRNFL thickness before and after surgery ($p = 0.749$) or in mGCIPL ($p = 0.2647$) or in total retinal thickness ($p = 0.446$) (paired t-tests). Greater decrease in IOP with surgery was significantly related to greater increase in cpRNFL thickness. Younger patients and those with worse pre-op cpRNFL thickness were more likely to have increase in cpRNFL thickness following surgery.

Conclusion: Increase in RNFL thickness associated with greater lowering of IOP has been noted for at least 18 months following trabeculectomy in this study.

P4.42
Ahmed clearpath in refractary glaucoma: 2 year follow up of safety and efficacy

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Purpose: To evaluate the efficacy of the new Ahmed ClearPath® glaucoma drainage device in the treatment of refractory primary open angle glaucoma (POAG).

Methods: Intraocular pressure (IOP), number of antiglaucoma medications, and complications were retrospectively reviewed in POAG patients over 18 years old who underwent Ahmed ClearPath® implantation surgery at our institution with 24 months of follow-up. Patients with previous ocular procedures such as phacoemulsification (n = 11), Micropulse transscleral photocoagulation (n = 7), and xen gel stent implantation (n = 4) were included.

Results: 12 eyes of 11 patients (mean age 72.3 ± 13.8 years) fit inclusion criteria and were enrolled. Most patients were Caucasian (n = 9), female (n = 11), and had severe POAG (n = 11). Mean baseline IOP was 29.0 ± 7.6 and was reduced to 11.2 ± 3.9, 7.9 ± 4.2, 10.9 ± 5.6, and 11.2 ± 4.6 at 6, 12, 18, and 24 months respectively. Compared to baseline, IOP reductions

were 61.4%, 72.8%, 62.4%, and 61.4%. 80% of patients who made the 24-month follow-up reached an IOP of ≤ 14 mmHg. Mean baseline number of medications was 3.0 ± 0.9 and was reduced to 0.67 ± 0.8, 0.57 ± 0.8, 0.7 ± 1.0, and 0.6 ± 0.5 at 6, 12, 18, and 24 months respectively. Compared to baseline, medication reductions were 77.7%, 81%, 76.3%, and 80%. Mild hyphema was noted as a post-operative complication in half of the population (n = 6), but resolved during each one month follow-up. No long-term complications were observed.

Conclusion: To our knowledge, this is the first long-term study evaluating the efficacy of the Ahmed ClearPath drainage device in adult patients. The ClearPath device is safe and effective at reducing both IOP and medication burdens in patients with severe POAG. Additionally, minimal short-term complications were noted and no patients within our study experienced long-term adverse effects, increasing comfort for both the surgeon and the patient.

P4.43
PreserFlo as a rescue surgical technique. Results after six months

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Purpose: To analyze the results of patients undergoing Glaucoma surgery using the PreserFlo device as a rescue surgical technique.

Methods: A descriptive observational study was carried out in which we included 9 eyes of 9 patients, over 18 years old, who underwent Glaucoma Surgery using the PreserFlo device. The results of most patients with advanced primary open angle glaucoma, previously operated on with a filtering surgery that failed, are analyzed. The parameters studied were IOP and the number of drugs prior to surgery and in the postoperative period at 24 hours, 2 weeks, 3 months and 6 months after the intervention. In addition, the number of complications or need for reoperation was recorded.

Results: The initial diagnosis of the sample was: primary open angle glaucoma (78%), chronic angle closure glaucoma (11%), congenital glaucoma (11%). The preoperative mean IOP was 23.77 ± 8.08 mmHg and decreased to 15.66 ± 6.12 mmHg six months after the intervention. Medication use decreased IOP from a mean of 3.22 ± 0.44 mmHg to 1.16 ± 0.98 mmHg per patient. There was no need for reoperation in any of the patients. As a complication, a case of serous choroid detachment is described that responded favorably.

Conclusion: Glaucoma surgery by PreserFlo as a rescue technique is effective to reduce IOP and allows the reduction of antiglaucomatous medication. This surgical technique could be a good alternative for those patients with failure to previous filtering surgery. We need more studies and with a greater number of patients to evaluate its long-term efficacy.

P4.44
Efficacy and safety of the XEN45 implant at 4 years

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Purpose: Evaluation of the effectiveness and security, as well as the need and effectiveness of the revision or post-surgical needling, of the XEN45 implant over a 4-year follow-up period (from 2017 to 2021) of 200 eyes.

Methods: Observational and retrospective study carried out in a single center, which included 200 eyes operated on with XEN45 implant surgery or combined with cataract surgery. Changes in intraocular pressure (IOP), visual field indexes, average thickness of nerve fiber layer in OCT, number of hypotensive drugs, post-surgical complications, need for revision, needling or reintervention; were collected at 6, 12, 24, 36 and 48 months since the surgery. Complete surgical success was defined when postoperative IOP < 18 mmHg were achieved without the need of any drug; and partial surgical success if hypotensive drugs were needed to achieve that pressure.

Results: 200 eyes from glaucoma patients operated on isolated XEN45 implant surgery or combined with cataract were included in this study. The average age was 72.8 ± 11.1 years (44.4% men and 55.6% women) The presurgical IOP was 20.47 ± 5.27 mmHg (with a mean of 2.61 ± 0.96 drugs); and after the implant surgery, the IOP measures were: 16.51 ± 4.88 mmHg at 6 months (with 1.13 ± 1.23 drugs), 16.00 ± 3.76 mmHg at 12 months (with 1.21 ± 1.19 drugs), 15.68 ± 3.76 mmHg at 24 months (with 1.41 ± 1.77 drugs), 17.21 ± 4.08 mmHg at 36 months (with 1.59 ± 1.24 drugs), and 15.90 ± 3.94 mmHg at 48 months (with 2.29 ± 2.43 drugs). The proportion of complete surgical success was 39% at 6 months, 32% at 12 months, 36.3% at 24 months, 31% at 36 months, and 19% at 48 months (keeping in mind that, in some cases, revision or needling of the implant were required: 13.6% at 6 months, 7.6% at 12 months, 4.6% at 24 months, 6.4% at 36 months). The number of post-surgical complications was greatly reduced.

Conclusion: XEN45 implant surgery is a safe and effective technique for the treatment of glaucoma, considering the possibility of needing a surgical revision or needling during the follow-up.

P4.45
Intraocular pressure control, bleb morphology and adverse effects after trabeculectomy with adjunctive use of Mitomycin - C and bevacizumab

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Purpose: To compare the control of intraocular pressure (IOP) with bleb morphology and adverse effects after trabeculectomy with the adjunctive use of mitomycin - C (MMC) and bevacizumab.

Methods: In this quasi experimental study,106 patients of either gender with diagnosis of Primary Open Angle Glaucoma (POAG) fulfilling the inclusion criteria were planned for trabeculectomy with adjunctive use of MMC or bevacizumab. Each group consisted of 53 patients (53 eyes) having IOP of more than 21 mmHg not

control pharmacologically.

Results: Mean age of patient was 56.67 ± 7.34 years. Mean preoperative IOP was 31.51 ± 9.66 mmHg in MMC group and 29.21 ± 7.69 mmHg in bevacizumab group. At first postoperative day, mean IOP after use of MMC was 14.75 ± 9.46 mmHg and for Bevacizumab was 15.07 ± 6.47 mmHg (p-value 0.001). Similarly, at one-year follow-up, mean IOP for MMC group was 11.26 ± 2.31 mmHg for bevacizumab was 11.73 ± 2.12 mmHg (p-value 0.001). Regarding bleb morphology, 28 (52.8%) and 35 (66.03%) patients had elevated bleb for MMC and bevacizumab group at day 1 postoperatively. Similarly, at one-year follow-up, 42 (79.24%) and 39 (73.58%) patients had elevated bleb in MMC and bevacizumab groups respectively. At first day postoperatively, 48 (90.56%) and 51 (96.22%) patients had vascularized bleb for MMC and bevacizumab, respectively. However, at one-year follow-up, only 8 (15.09%) and 15 (28.30%) patients had vascularized bleb for MMC and bevacizumab group. At first day postoperatively, hyphema was observed in 2 (3.77%) eyes in MMC group and none in bevacizumab group. Similarly, 10 (18.8%) and 4 (7.54%) patients had flat anterior chamber for MMC and bevacizumab group at first day postoperatively. Two patients in MMC group developed hypotomy (IOP Ð 6 mmHg) after 3 months of surgery. One patient in each group had conjunctival leak postoperatively. All these complications resolved conservatively without any added procedure.

Conclusion: There was a reduction in IOP in both MMC and Bevacizumab groups which was statistically not significant at end of one year. Bleb morphology was also found almost similar at one year follow up while significant difference was found between adverse effects of both drugs.

P4.46
Systematic review of the method and quality of reporting of complications from studies evaluating innovative glaucoma surgical procedures

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Purpose: To identify how reporting of micro-invasive glaucoma surgery (MIGS) procedure complications are reported in randomised controlled trials (RCTs) and the quality of this reporting compared to the CONSORT extension for harms.
Methods: RCTs evaluating MIGS procedures were identified from a database of systematic reviews and from recent literature. Trials were evaluated in comparison to the CONSORT extension for harms to quantify the quality of harms reporting. Simple descriptive statistics were calculated for the CONSORT checklist.

Results: 21 trials were identified as eligible for inclusion, 14 were evaluating iStent, one Trabectome, three Hydrus, one Cypass, one Preseflo MicroShunt and one Excimer laser trabeculotomy. The average number of CONSORT for Harms checklist items fulfilled by the studies was 10 out of 16. No studies used a validated instrument to report severity of harms and only 4 had a list or definition of adverse events. An analysis of harm was conducted by 19 of 21 studies (90%). Appropriate metrics were used for reporting rates of adverse events in 19 of 21 studies but in only 4 studies was there an attempt to give these adverse events a grade of seriousness.

Conclusion: Most studies evaluating MIGS procedures do make an effort to acknowledge harms data, however this is not done uniformly well or in the same manner. A validated instrument to report severity and a standard list of complications for MIGS surgery would go a long way to helping this.

P4.47
IStent Inject: our results

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Purpose: Study the reduction of intraocular pressure (IOP) and number of hypotensive treatments after iStent inject implantation in our clinical practice.

Methods: Retrospective study of 52 eyes of 40 patients who underwent surgery with iStent Inject. The study variables were IOP, the number of hypotensive medications and the incidence of complications. Baseline IOP data and at 24h, 1 week, 1 month, 3, 6 and 12 months postoperatively were collected.

Results: Combined iStent inject plus phacoemulsification surgery was performed in 90.4% of the patients. In 44 patients, the diagnosis was open-angle glaucoma and in 8 patients, angle-closure glaucoma was associated with phacoemulsification. Mean baseline IOP was 19.8 mmHg (17.9-21.7), on day 1 it was 21.4 mmHg (19.5-23.3), at week 1 it was 16.9 mmHg (14.5-19.3), at month 1 of 17.6 mmHg (15.5-19.7), at month 3 of 17.2 mmHg (14.7-19.7), at month 6 of 18.3 mmHg (14.9-21.7) and at 12 months 18.2 mmHg (15.1-21.4). IOP at week 1 was significantly lower than baseline ($p = 0.048$), with no significant differences in the rest of the follow-ups. The preoperative number of medications was 1.65 ± 1 and at 12 months 0.31 ± 0.68 ($p < 0.0001$). During follow-up, 7 patients (13.4%) needed ND-YAG laser treatment due to obstruction of the iStent by the iris. The mean IOP at 24h in the eyes that required ND-YAG laser treatment was 28.14 mmHg (23.1-33.1), with significant differences ($p = 0.037$) compared to the patients that did not present obstruction of the implant. No significant differences were observed in the follow-up visits.

Conclusion: The iStent inject implant was shown to be effective and safe to reduce the number of hypotensive medications. A good pressure control was observed. Obstruction of the iStent by the iris can occur, requiring ND-YAG laser for its release. In this case it is recommended to perform gonioscopy in the postoperative period, especially in patients with elevated IOP at 24h.

P4.48
Hydraulic conductivity of the filtering bleb wall with the PreserFlo MicroShunt: objective mathematical measurement of bleb function

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Purpose: To analyze the hydraulic conductivity of the filtering bleb

wall formed after glaucoma surgery with PreserFlo. The hydraulic conductivity is a physical property of the capsule associated with each type of glaucoma filtering surgery. The hydraulic conductivity of the PreserFlo´s bleb as an objective mathematical measurement of function has not yet been investigated

Methods: The HC was defined by Park as the flow rate (Q, µL/min) per unit membrane (mm^2) at a unit pressure gradient (mmHg). The flow rate through PreserFlo (Q) has been shown to be a linear function of pressure. The filtering surface (mm^2) can be calculated mathematically assuming bleb surface as a "spherical cap" (Figures 1,2), where the "roof" area = π (a^2 + h^2), the "floor" area = π a^2 and the total filtration area = π (2 a^2 + h^2). Bleb diameter (2a), height (h) and wall thickness were measured with AS-OCT at 6 and 12 months after surgery with Mitomicyn C 0.02%. IOP was measured with Goldmann Aplannation Tonometry

Results: Mean bleb diameter (2a) and height (h) were 3499.4 ± 1870.1 and 490.2 ± 276.9 µm at 6 months and 3679.2 ± 2101.8 and 507.8 ± 293.5 µm at 12 months. The mean "roof" area was 13.3 ± 10.6 and 15.1 ± 12.8 mm^2, and mean "total" area, 25.6 ± 20.7 and 29.1 ± 24.9 mm^2 at 6 and 12 months. Mean flow (Q) was 7.4 ± 2 and 7.3 ± 1.7 µL/min, mean IOP 12.3 ± 3.5 and 12.2 ± 2.9 mmHg and mean wall thickness 596.9 ± 227.9 and 606.5 ± 232.2 µm at 6 and 12 months. Mean hydraulic conductivity for the single surface (roof) was 0.13 ± 0.2 and 0.14 ± 0.19 and for the total surface 0.07 ± 0.1 and 0.08 ± 0.1 (µL/min) /mm^2/ mmHg a 6 and 12 months.

Conclusion: The hydraulic conductivity (µL/min/mm^2/ mmHg) of the PreserFlo´s bleb wall at 1 year (0.08 ± 0.1) appears to be two orders of magnitude superior to the Baerveldt (0.0006) and Molteno implants (0.0004) whithout undermining the hypotensive efficacy.

P4.49
Is direct anaesthetic support needed for all Baervelt tube surgery?

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Purpose: The Baervelt tube is one of the commonest tube implants used to control intraocular pressure (IOP). Predominantly, surgery is performed under general anaesthetic (GA) or sedation, requiring anaesthetic support. There's a significant shortage of anaesthetists in the UK, which has worsened during the COVID-19 pandemic. The national backlog for surgery is likely to persist for some time. We assessed whether tube surgery under local anaesthetic (LA) without anaesthetic support is a viable option.

Methods: A retrospective review was conducted of consecutive LA Baervelt tube surgeries by a single surgeon (JK) from 2016 to 2021 at the Queen Alexandra Hospital, Portsmouth. A patient questionnaire was undertaken to assess overall satisfaction of the procedure. Patient demographics, co-morbidities, pre- and post-operative IOPs and surgical time were collated. The demographics and co-morbidities of patients who underwent GA tube surgery were also collated.

Results: LA technique was with peribulbar and superior sub-tenons injection. 27 eyes of 26 patients underwent LA surgery, and 42 eyes of 40 patients had GA surgery. Median age at time of surgery was 71 (range 46-84), and 61 (range 28-88) in each group respectively. Comparatively, fewer in the LA group had no systemic co-morbidities (LA: n = 5, 18%; GA: n = 19, 45%). Additionally, the LA cohort had a higher proportion of patients whose only ocular diagnosis was glaucoma (LA: n = 13, 48%. GA: n = 6, 14%). Median LA surgery time, including anaesthesia, was 45 minutes (range 25-81m). Mean overall satisfaction in LA patients were 4.93/5 (range 4-5), only two patients reported minimal intraoperative discomfort, and 100% would undergo further LA procedures if required.

Conclusion: Baervelt tube surgery under local anaesthetic may be a valid alternative, particularly for less complex eyes and those with more systemic co-morbidities who may not be suitable for GA. Excellent patient satisfaction and good IOP reduction was achieved in almost all cases.

P4.50
Long term effects of trabeculectomy on visual field progression across two centres in the United Kingdom: a 10 year follow up

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Purpose: Trabeculectomy is the most performed surgical procedures for glaucoma in the UK. The overarching aim is to achieve good IOP control, and thereby halt or slow further visual field loss. We aim to analyse whether trabeculectomy is successful in achieving long term visual field stability.

Methods: A retrospective analysis was performed on patients who underwent a trabeculectomy between 2001 and 2010 at the Queen Alexandra Hospital in Portsmouth and Queen Elizabeth hospital, Birmingham. Only eyes with minimum five years of follow up post operatively, and visual fields before surgery and at least 5 years after were included. Patient demographics and comorbidities, IOP before and after surgery, visual fields prior to surgery and at the most recent follow up were collated and analysed.

Results: 146 eyes of 110 patients were eligible. The median follow-up time was 10 years (range 5-17.5 years) and median visual field progression per year is -0.12dB. 69% (n = 101) achieved stable visual fields post op (MD loss/year < 0.3dB), 14% (n = 20) showed borderline progression (0.3 to 0.5dB MD loss/year), 13% (n = 19) showed moderate progress (0.5 to 1dB loss/year), and 4% (n = 6) showed rapid progress (MD loss > -1/year). Median IOP reduction at final follow up compared to before surgery wass 47%. The eyes that achieved good IOP control (< 12 mmHg, n = 96) had a median visual field progression of -0.08dB/year. All six cases of rapid progression were confounded by concurrent severe systemic illness (two cases of metastatic cancer, one case each of infective endocarditis and severe hypotension) or non-glaucoma ocular conditions (one case each of diabetic maculopathy and advanced age-related macular degeneration)

Conclusion: In the majority of these cases (83%, n = 121), trabeculectomy resulted in good control of visual field stability. Its positive effect on visual field stability is enhanced when the final IOP is less than 12 mmHg.

P4.52
Surgical outcome of Molteno3 in uncontrolled glaucoma

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Purpose: To evaluate the outcome of Molteno3 drainage device implantation in uncontrolled glaucoma in a Spanish site.

Methods: A retrospective clinical study of the first 32 eyes to receive Molteno3 surgery in a clinical setting in Barcelona, Spain with a minimum follow-up of 6 months. Failure was defined as intraocular pressure (IOP) > 21 mmHg or less than 20% reduction of IOP from baseline, IOP ≤ 5 mmHg, reoperation of glaucoma or loss of light perception vision.

Results: The mean ± SD preoperative intraocular pressure (IOP) was 28.2 ± 9.9 mmHg with a mean of 2.6 ± 1.2 ocular hypotensive medications. The mean postoperative follow-up was 2.1 years. The mean postoperative IOP at the last follow-up visit was 14.9 ± 4.7 mmHg, with a pressure drop mean of 13.3 mmHg (47%) ($p < 0.0001$; 95% CI 9.59-16.96) and a mean reduction of ocular hypotensive medications of 1.3 ($p = 0.00014$; 95% CI 0.66-1.84). On the last follow-up visit, 24 eyes (75%) were considered successes and 8 eyes (25%) were considered as failures. The most frequent complications reported were seidel (3 eyes), serous choroidal detachment (3 eyes) and diplopia (3 eyes). The most serious adverse event was choroidal hemorrhage (2 eyes). There were no cases of malignant glaucoma, retinal detachment, or phthisis bulbi.

Conclusion: The Molteno3 implant significantly lowered both the IOP and the medication score in patients with uncontrolled glaucoma.

P4.53
10+ year clinical outcomes of tube shunt surgery on glaucomatous patients

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Purpose: To evaluate the long-term surgical outcomes of tube shunt (TS) surgery in patients with various types of glaucoma.

Methods: This retrospective chart review included patients who underwent TS surgery from 01/2006 to 01/2012. Patients with at least 10-years of follow-up data were included. Demographic and clinical data were collected at the pre-operative and post-operative follow-up visits until their latest visit (up to 02/2022). Surgical failures were defined as eyes that required reoperation or progressed to no light perception (NLP).

Results: 40 eyes of 36 patients were included. Mean age was 60.1 ± 10.1 and mean follow-up was 11.8 ± 1.7 years after first TS surgery. At the last visit, BCVA logmar in the operated eye declined from 0.8 ± 0.7 to 1.3 ± 0.8 ($p < 0.001$, cup-to-disk ratio increased from 0.6 ± 0.3 to 0.8 ± 0.2 ($p = 0.008$), visual field progressed from -12.3 ± 6.7 to -16.3 ± 6.5 ($p = 0.309$), glaucoma medication use reduced from 3.1 ± 1.2 to 2.1 ± 1.52 ($p < 0.001$), and intraocular pressure (IOP) lowered from 30.0 ± 10.2 mmHg to 11.9 ± 10.2 mmHg ($p < 0.001$). 22 eyes (55%) had vision worse than 20/200 at their last visit and 2 eyes (5.0%) progressed to NLP. 9 eyes (22.5%) required additional TS surgery within 10-years with a mean IOP of 24.4 ± 12.9 before the subsequent TS surgery. Among the 24 eyes with an Ahmed valve, 11 (45.9%) required additional surgical intervention: 4 eyes underwent cyclophotocoagulations (18%), 1 trabeculectomy (4%), and 6 needed a second TS (25%). Among the 15 eyes with a Baerveldt implant, 5 (33.3%) required additional surgery, 2 (13.3%) of which required two procedures. 1 eye required a new TS (6.7%), 2 needed a trabeculectomy (13.3%), 1 eye underwent trabeculectomy + cyclophotocoagulation (6.7%), and 1 eye needed both a TS (switched to Ahmed valve) + cyclophotocoagulation (6.7%). One patient had an unspecified TS. During the follow-up period, 10 eyes (25%), 4 eyes (10%), and 3 eyes (7.5%) required one, two, and three TS revisions, respectively.

Conclusion: In this long-term retrospective study, patients undergoing TS surgery overall had maintained a therapeutic IOP and useful vision. However, a significant portion of patients underwent additional procedures with approximately a third of eyes requiring additional surgical interventions.

P4.54
Efficacy and safety of a novel Ahmed valve implantation technique: a 5-year retrospective study

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Purpose: To measure longterm safety and efficacy of a novel less scarring Ahmed valve implantation technique.

Methods: Study design: retrospective comparative case series, consecutive patients operated with an Ahmed valve implanted by adopting a novel technique (between 2012 - 2019) or with a more traditional approach (between 2005 - 2011). Data analyzed: anti glaucoma medications,IOP, visual acuity,post-op complications. Surgical technique: "Group A" Ahmed valvei traditionally implanted. "Group B": the tube ligated by a 7.0 polygalactin and 9.0 nylon limbal mattress suture placed by passing the needle "through" the tube, allowing aqueous to spill out. This approach leads to an anterior filtering bleb which scars during a time-frame compatible with the dissoluiton of the peritubular 7.0 polygalacting suture. A flow of a less "inflamed" and "irritating" aqueous through the imiplant to the plate occurs, allowing the formation of the proper retroequatorial bleb with less chance of intense scarring; the data were analyzed by (a) parametric statistics (IOP), (b) non paramteric statistics (medications, visual acuity, complications). Kaplan-Meier survival curves were fcreated according to different cut-off levels of IOP (with or without medications).

Results: 235 patients, with at least 5-year follow up, (Group B) compared with n = 127 (Group A). Group A: Pre-op IOP (mean, SD): 26.1 (9.1), 5-yr IOP 15.7 (4.2), Pre-op medications: 2.8 (1.2), 5-yr medications: 1.5 (1.1). Group B: Pre-op IOP (mean, SD): 26.7 (9.3), 5-yr IOP 13.6 (3.8), Pre-op medications: 3.5 (1.7), 5-yr medications: 1.2 (0.9). Both IOP values ($p < 0.001$ Student t test) and number of medications ($p < 0.01$, Chi Square test) were significantly different between the two groups 5 years after surgery. Post operative hypotony (11/235 and 15/168) and serous choroidal detachments (11/235 and 8/168) were comparable between the groups (Fisher exact tests, $p > 0.4$ for both variables). 4 hemorragic choroidal detachments occurred in group B and 2 in Group A.

Conclusions: The described novel implantation technique for the Ahmed valve allows a better 5-yr IOP outcome compared with

the traditional approach.

P4.55
Trabeculectomy vs non-penetrating deep sclerectomy for the surgical treatment of open-angle glaucoma: a long-term report of 201 eyes

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Purpose: Glaucoma is the second leading cause of vision loss worldwide. The reduction of intraocular pressure remains the backbone of its therapy. Among surgical techniques for its treatment, deep non-penetrating sclerotomy is the most widely practiced non-penetrating surgery. The purpose of this study was to evaluate the long-term efficacy and safety of deep non-penetrating sclerotomy compared to standard trabeculectomy in patients with open-angle glaucoma.

Methods: Retrospective study including 201 eyes with open-angle glaucoma. Closed-angle and neovascular cases were excluded. Absolute success was considered when intraocular pressure under 18 mmHg was reached without hypotensive medication and qualified success when intraocular pressure under 18 mmHg was reached with or without medication, after 24 months of follow-up period.

Results: No significant differences were found in mean intraocular pressure after 1, 6, 12, or 24 months. Absolute success rates were 69,2% and 67,9%, and qualified success rates were 88,3% and 84% for deep non-penetrating sclerectomy and trabeculectomy groups, respectively. There were no significant differences in success rates between groups. Regarding postoperative complications, mainly due to postoperative hypotonia, or related to the filtration bleb, they were significantly different between groups, with 10,8% and 24,7%, in deep-nonpenetrating sclerectomy and trabeculectomy groups, respectively.

Conclusion: Deep non-penetrating sclerectomy seems to be an effective and safe surgical option for patients with open-angle glaucoma unable to be controlled by non-invasive strategies. Data suggests that the intraocular pressure-lowering effect of this technique is similar to trabeculectomy, and it was associated with a lower risk of complications.

P4.56
XEN in the management of early glaucoma surgery: a national Delphi consensus study

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Purpose: Recommendations on general glaucoma management and the use of early minimally invasive and microincisional surgeries are limited. This study aimed to establish consensus and develop recommendations regarding glaucoma management, including patients' quality of life, therapeutic decisions, and surgical techniques, focusing on the XEN gel stent implant.

Methods: A Delphi consensus-driven process was used. The scientific committee (eight experts in glaucoma and XEN surgery) lead the study, identified the expert panel, and participated in elaborating the questionnaire. Fifty-one panelists from different Spanish centers were invited to answer, on a nine-point Likert scale, an 88-item questionnaire covering three topic blocks. Two Delphi rounds were performed. Consensus was achieved if ≥ 66.6% of panelists reached agreement or disagreement.

Results: Panelists agreed on 84 from the 88 items presented. The experts agreed that ophthalmologists should assess both tolerability and non-adherence to pharmacological treatment in glaucoma patients, and that XEN is an effective alternative that reduces or eliminates the burden of topical treatments and their adverse effects, while preserving the ocular surface, necessary for possible future interventions. Experts reached consensus on the suitability of XEN surgery as a first-line treatment in certain glaucoma patients, slowing progression and also saving sight years, and they agreed that XEN surgery was less invasive than other alternatives of filtering surgeries, and was considered a therapeutic step prior to classic filtering surgery. Panelists also agreed that combined cataract surgery with XEN decreases the risks as the patient undergoes only one procedure, and is less time-consuming compared to combined surgery with classic filtering surgery, and they considered that XEN implant surgery should be included in the portfolio of ophthalmology services and in ophthalmology residency training.

Conclusion: This Delphi-driven consensus resulted in a series of general recommendations for glaucoma management, including those related to patients' quality of life, therapeutic algorithm, and patient profile, and specific ones regarding the use of XEN stent gel surgery. The present study based on expert recommendations is a step towards the real-world use of minimally invasive and microincisional techniques and, in particular, the use of the XEN gel stent.

P4.57
Trab vs PhacoTrab: is a bird in the hand better than two in the bush?

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Purpose: Glaucoma is a progressive optic neuropathy, characterized by anatomical and functional anomalies. It´s treatment mainly consists of controlling it´s only modifiable risk factor, Intraocular Pressure (IOP). Essentialy, this can be made in a medical or a surgical way, in wich one we will focus. Our objective is to review if there are differences between different surgical modalities (doing just Trabeculectomy (Trab) or Phacoemulsification with Trabeculectomy at the same time (Phacotrab); using Mytomicin C or Ologen) in IOP reduction or surgical complications.

Methods: This is a retrospective study from 135 of our patients, from which 157 eyes were submitted to Glaucoma surgery (Trab or PhacoTrab). We evaluated the mean age; gender; mean IOP before surgery, a day, a month, and a year after; mean number of topical therapy medication before and a year after surgery; Best corrected visual acuity (BCVA) before and a year after surgery. Differences in IOP reduction and surgical complications (Hiphema, Hypotony, Scarring, IOP spikes, endophthalmitis, bleb leakage) in doing Trab alone or Phacotrab, and by using Mytomicin C or Ologen.

Results: We found that mean IOP was 23.53 ± 6.78 before surgery and a year later 14.71 ± 4.01; mean topical medication was 3.38 ± 0.90 before surgery and a year later 1.38 ± 1.53; there was no statistical significance in IOP reduction by doing just Trab or Phacotrab (p = 0.36) or by using Mytomicin C or Ologen (p = 0.67); there was also no statistical significance in surgical complications by doing just Trab or Phacotrab (p = 0.31) or by using Mytomicin C or Ologen (p = 0.35); mean BCVA was 0.49 ± 0.31 and a year after 0.49 ± 0.34

Conclusion: Trabeculectomy is probably Glaucoma's surgery that has most maintained in the vanguard of the treatment of this pathology. Even with the advent the Minimal Invasive Glaucoma Surgery (MIGS), it is still a valid option. We didn't find a statistical significant difference in IOP reduction and complications between the different modalities.

P4.58
Micro-pulse cyclophotocoagulation in the treatment of various types of refractory glaucoma

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Purpose: To evaluate and compare the efficacy and safety of surgical treatment by using Micro-Pulse Cyclophotocoagulation ("IRIDEX" Laser System) in patients with various types of refractory glaucoma.

Methods: In our prospective study we included 50 patients (50 eyes) with refractory glaucoma and uncontrolled intraocular pressure (IOP). Study groups: I Congenital glaucoma (11 eyes), II Secondary glaucoma (neovascular - 9, uveal - 9 eyes), III Previously operated open-angle glaucoma (10 eyes), IV Terminal glaucoma (11 eyes). Micro-pulse cyclophotocoagulation was performed with 2000 mW energy, 31.3% duty cycle, 180-degree applications of 80 seconds duration. The first-generation MP3 handpiece was used. All patients were followed up for 7, 30 days and 3, 6 months.

Results: During and after surgery complications were not observed. A month later IOP decreased to 19.3–25.8 mmHg at average (p < 0.0001). Mean IOP was 19.3 ± 2.05, 22.1 ± 5.6, 22.6 ± 6.63 mmHg in I, III and IV groups, the mean glaucoma drops number was 2.7 ± 0.75 (p < 0.0001). Patients with secondary glaucoma (II group) in 49,7% of cases needed additional methods for IOP normalization. The reasons for failure were inadequate rubeosis and blockage of drainage meshwork. Panretinal coagulation was performed in 3 eyes, Ahmed valve implantation in 6 eyes. With such additional surgery the range IOP in these group was 17.3–18.4 mmHg for 3 months after treatment (p < 0.0001). In the follow-up period (6 month) the mean IOP was 19.5 ± 2.5 mmHg with mean glaucoma drops number 1.6 ± 1.3 (p < 0.0001). Visual functions did not change in I, II and III groups in long-term follow-up (6 months), all patients had stable visual fields. There was no decrease in visual acuity in these groups.

Conclusion: Our study data confirm that Micro-pulse cyclophotocoagulation (MPCP) is technically easy and safe surgery for eyes with refractory glaucoma. Good IOP control was recorded in eyes with congenital, previously operated open-angle glaucoma and terminal types of refractory glaucoma in long-term follow-up, but in eyes with secondary glaucoma only in the short-term.

P4.59
The expansion of the criteria for Ahmed glaucoma valve implantation

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Purpose: The aim is to define the indications for Ahmed glaucoma valve implantation based on duration and mode of hypotensive therapy, and the structure of previous intervention analysis.

Methods: The retrospective evaluation of the duration and rate of medical treatment and the structure of laser and surgical procedures in a group of 139 patients (153 operations) undergoing Ahmed glaucoma valve implantation in 2009-2011 and a group of 270 patients (272 operations) in 2019-2010.

Results: The average age of a candidate for implantation of the Ahmed valve increased from 63 years in 2009-2011 to 70 years in 2019-2020. There was an elongation of the treatment before Ahmed valve implantation from 8.8 ± 1.4 to 11.2 ± 1.1years leading to increasing of cumulative preservative toxicity from 9293.8 ± 968.6 to 10038.1 ± 888.9 mcg. The main classes of antihypertensive drugs were prostaglandin analogues (75.4% in 2009-2011 and 77.1% in 2019-2020), carbonic anhydrase inhibitors (75.4% and 82.6%), and beta-blockers (57.4% and 61.1% accordingly). Laser trabeculoplasty was performed in only 11.8% and 28.7%, respectively. Hypotensive filter-type operations predicted valve implantation in 63.4% (2009-2011) and 82.7% of cases (2019-2020), while in the rest of the patients the installation of the Ahmed device was the first surgical procedure. Despite the treatment, the rate of glaucoma progression to an advanced stage increased from 62.1% in 2009-2011 to 82.7% in 2019-2020.

Conclusion: The extension of the medical treatment of glaucoma involves its progression, and the increased preservative toxicity reduces the effectiveness of conjunctival surgery. To sum it up, there is a need for an earlier start to surgery for the normalization of intraocular pressure with the intensive use of the Ahmed glaucoma valve not only in secondary but also in primary open-angle glaucoma with a long (over 7-8 years) period of its medical treatment.

P4.60
Preliminary results of a new technique for ab externo implantation of the XEN gel stent performed at the slit lamp (SLX)

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Purpose: The purpose of this study is to describe the author's experience with a new technique for the implantation of the Xen gel stent, and to report the preliminary outcomes of the first cases performed using this technique.

Methods: Patients suffering from uncontrolled glaucoma despite maximal medical therapy were selected to undergo the Xen implantation procedure. The surgeon attempted ab externo Xen stent implantation (SLX) with mitomycin C performed at the slit lamp under topical anesthesia. The preoperative and post-operative data from these patients were collected retrospectively. The data was analyzed to compare preoperative and postoperative intraocular pressure control, number of medications and mean deviation on the visual field test, as well as other pertinent data points.

Results: The surgeon attempted the SLX technique on 9 eyes of 8 consecutive patients, and succeeded in 7 cases. These seven

cases were included in the statistical analysis. The patients had a mean age of 71.5. The IOP was significantly reduced from a preoperative mean of 20.3 mmHg to a post-operative mean of 11.7 mmHg at the 3-month post-operative visit ($p < 0.05$). The number of medications used was also significantly reduced from a mean of 3.5 down to a mean of 0.3 after 3 months ($p < 0.05$). The patients maintained their preoperative visual acuity and visual field. The procedure was very well tolerated by the subjects, and there were no serious postoperative complications.

Conclusions: The SLX is a viable minimally-invasive and efficient technique which can be performed in the office with no special equipment. The learning curve is steep for the experienced glaucoma surgeon, and the results are comparable to the conventional ab interno and ab externo implantation techniques performed in the operating room.

P4.61
Serous choroid detachment after glaucoma filtering surgery: series of 23 eyes

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Purpose: The objective of the study is to describe the triggers, duration, treatments and sequelae of choroid detachments (CD) in patients undergoing filtration surgery (NPDS, trabeculectomy (TBC), Ex-press implant and Xen implant).

Methods: Retrospective series of DC in 21 patients (23 eyes) after filtering surgery performed between 2012-2021 at Vall d'Hebron University Hospital. The variables collected were: type of surgery, triggering maneuver, characteristics of the CD and the anterior chamber, visual acuity (VA), IOP, treatment protocol and duration of the CD.

Results: 13% (n = 3) of the CD appeared in the postoperative period of TBC and 9% (n = 2) in the Express period. 35% (n = 8) of the CD presented post-goniopuncture in the NPDS and 17% (4%) after needling in the TBC. 13% (n = 3) after surgical revision and 13% (n = 3) in a miscellaneous of situations. 95.6% (n = 22) of the CD resolved with a median of 36 days without differences between etiologies or treatments carried out. 43.5% (n = 10) resolved with medical treatment, 21.7% (n = 5) with injection of viscoelastic in the anterior chamber in a slit lamp, 27% (n = 6) after surgical review. One patient required vitrectomy surgery and transcleral drainage and one patient developed persistent CD despite treatments. The median of previous IOP and VA during and after CD resolution were 20, 4 and 10 mmHg and 20/40, 20/200 and 20/50 respectively. No significant differences were found between pre- and post-resolution VA.

Conclusion: CD are complications associated with hypotonia due to the surgery itself or post-surgical maneuvers. Most improve with medical treatment but sometimes require surgical treatment. The follow-up and treatment carried out allowed the reduction of the IOP, regarding the IOP pre-surgery maintaining the VA.

P4.62
Use of ologen implant in glaucoma filtration surgeries: a six-months follow up

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Purpose: To assess if using ologen implant in glaucoma filtration surgery as an adjuvant to mitomycin C reduces the need of additional interventions to maintain ideal intraocular pressure.

Methods: This is a retrospective single surgeon study of glaucoma patients that required filtration surgery either with trabeculectomy or non penetrating deep sclerectomy with mitomycin. We included 83 eyes from 76 patients, 30 eyes were intervened without Ologen implant (Group 1) and 53 eyes with Ologen implant (Group 2). After a follow-up of 6 months we studied the IOP reduction, the additional interventions required such as bleb needling, laser suture lysis, goniopuncture and reoperations (Trabeculectomy, non penetrating deep sclerectomy or a valve) and the mean antiglaucoma medication use reduction.

Results: After 6 months of follow-up, IOP for group 1 was 14.48 (DS ± 5.15) against 13.69 (DS ± 4.75) in group 2. We observed a total IOP reduction of -6.86 (DS ± 5.15) in group 1 and -10.06 (DS ± 3.7) in group 2 with the same reduction of antiglaucoma medication 2.17 (±DS 1.5) vs 2.17 (±DS 1.5) in both groups. 7 eyes in group 1 required bleb needling (23.3%) versus 10 eyes (18.8%) in group 2 and laser treatment either for goniopuncture or suture lysis were needed in 15 eyes (50%) in group 1 against 34 eyes (58%) in group 2. The number of reoperations was 16% in group 1 (5 eyes) against 5,4% (3 eyes) of group 2.

Conclusion: In this study we observed that the use of ologen implant in filtration surgeries induces a greater reduction in IOP pressure with the same required antiglaucoma medication at a six months follow-up. It also reduces the need for bleb needling. On the other hand we observed a minor increase in the use of laser related treatment (goniopuncture and lysis suture). To sum up, Ologen is a good option to help reduce IOP in filtration surgery without increasing complications, although further studies are required.

P4.63
Outcomes of eyeWatch valve implantation for refractory glaucoma

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Purpose: The aim of this study is to present a case series of patients with refractory glaucoma, treated with the new valve eyeWatch. This drainage device can be adjusted to lower the intraocular pressure (IOP) thanks to a magnet incorporated into the device.

Methods: Five patients have been included. Four of them had eyeWatch implantation as first line treatment. Patient 1: female, 50 years-old (yo), high myopia, primary open-angle glaucoma, IOp = 12 mmHg with 4 drops and acetazolamide, poor compliance due to dry eye and many side effects. Patient 2: male, 68 yo, pseudo-exfoliative glaucoma, radial keratotomies, IOp = 15 mmHg with 4 drops and progressive disease. Patient 3: male, 48 yo, uveitic glaucoma, history of retinal detachment and ab-externo surgery, IOp = 40 mmHg with 3 drops. Patient 4: female, 62 yo, angle-closure glaucoma, IOp = 19 mmHg with 2 drops and sulfamides allergy. Patient 5: female, 74 yo, pseudo-exfoliative glaucoma, failure of bleb revision after previous deep

sclerectomy, IOP = 32 mmHg with 3 drops.

Results: After 6 months, IOP was under 12 mmHg for all of them. The 2 patients with pseudo-exfoliative glaucoma had a treatment to reduce aqueous humor secretion to stop encapsulated cyst but healing process is faster in that type of glaucoma. We did not notice corneal damage and patient 1 did not mention issues for contact lenses wearing even on the operated eye.

Conclusion: EyeWatch device might be of interest in refractory cases as an alternative to standard procedures.

P4.64
Safety profile and efficacy of trabecular micro-bypass system iStent™ experience from a single centre in UK

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Purpose: To evaluate the safety profile and efficacy of Trabecular Micro-bypass system, iStent™ over a period of one year.

Methods: Retrospective, single-centre, analysis of 107 patients who underwent iStent™ procedure with or without phacoemulsification, between July 2016 and November 2020. The primary outcome was to evaluate the intraocular pressure (IOP) recorded at preoperative baseline, first post-operative follow-up, and at one-year. Complications and success of implantation were also evaluated as secondary outcomes.

Results: 128 eyes of 107 patients underwent iStent™ procedure during the 53-month period. The procedure was standalone in 20 eyes (15.63%) while 108 eyes (84.38%) eyes had iStent with phacoemulsification, performed by five surgeons. Mean age of patients at surgery was 76.23 ± 9.72 years, with slightly higher female preponderance (69 females, 59 males). Primary open angle glaucoma was the common diagnosis at 60.94%, followed by ocular hypertension (6.25%), pseudo exfoliation (4.69%), normal tension glaucoma (3.91%), glaucoma suspect (2.34%). 10.94% eyes with Primary angle closure also had the iStent™. Both first generation iStent™ in 17.97% (n = 23) and second generation iStent™ Inject in 82.03% (n = 105) were used during this period. Mean IOP improved by 15.28%, from a mean baseline of 18.20 ± 5.28 mmHg to 15.42 ± 3.95 mmHg at one year postoperatively. Paired t-test showed the IOP reduction was statistically significant ($p < 0.001$). Seventy-seven eyes (73.3%) were successfully implanted with both iStent™ Inject implants while 19 (18.1%) had only one stent implanted due either to surgical challenges (31.58%) or malfunctioning of the delivery system (42.11%); the reason for difficulty was not stated in 23.6%. Intraoperative bleeding was seen in 11.27% but hyphema was observed in only one eye, postoperatively. Cystoid macula oedema and postoperative IOP spike (defined as IOP above 21 mmHg) were the common complications, observed in only two cases (1.5%) each.

Conclusion: This real-world study of using iStent corroborates the efficacy and reaffirms the good safety profile of iStent™. The effective reduction of IOP is in all likelihood, independent of initial gain from phacoemulsification that remains sustained over the year.

P4.65
Study of the efficacy of selective laser trabeculoplasty in ocular hypertension and glaucoma

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Purpose: The main objective is to determine the degree of efficacy of selective laser trabeculoplasty (SLT) evaluated by lowering intraocular pressure (IOP). A secondary aim is to assess the change in the number of intraocular hypotensive drugs.

Methods: Retrospective study, consecutive sampling. Thirty-five patients (48 eyes) who underwent SLT with a minimum follow-up period of three months. The variables analyzed were age, sex, previous surgeries, ocular hypotensive drugs before and after treatment (3 months) and IOPs before and after treatment (3 months). An analysis of quantitative variables (age, IOP, number of active ingredients) was performed with Student's t test for paired data or non-parametric test if a normal distribution was not followed. Analysis of qualitative variables (sex, previous surgeries, active ingredients) using the Chi-Square or Fisher test according to the normality of the sample. Comparison of mean IOP and number of hypotensive drugs before and after laser treatment using the Wilcoxon statistical test. A p value less or equal to 0.05 is considered a statistically significant difference.

Results: Data analysis showed a mean age of 68 years, 20 eyes were from female patients (41.6%), 47.91% of the eyes had not undergone previous surgery (45.83% had undergone phacoemulsification, 6.25% trabeculectomy / EPNP / iridotomy / YAG capsulotomy and 2.08% goniopuncture or cerclage).
A statistically significant difference was found between the mean IOPs before (mean value 19.07 ± 4.24 mmHg) and after SLT (17.46 ± 4.566 mmHg), with the IOP being lower in 29 (60.40%) of eyes after SLT laser treatment, with a mean decrease of -2,972 mmHg. The difference between the mean of active ingredients before (1.69 ± 0.926) and post SLT (1.04 ± 0.967) was also statistically significant, a decrease was observed in the number of drugs necessary to maintain a controlled IOP in 29 (60.40%) of the eyes studied, with all drugs being withdrawn in 18 of the eyes in our sample (37.5%).

Conclusion: Selective laser trabeculoplasty can be useful to reduce IOP and also to reduce the number of drugs for its control.

P4.66
Short- to medium-term outcomes of Kahook Dual Blade excisional goniotomy with concomitant phacoemulsification: a pan-Canadian study

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Purpose: To examine the efficacy and safety of ab-interno excisional goniotomy using Kahook Dual Blade (KDB) with concomitant phacoemulsification cataract surgery in eyes with various glaucoma subtypes and severities.

Methods: This multi-center consecutive case series included

glaucomatous eyes with cataract that underwent KDB goniotomy with cataract surgery and had a minimum follow-up data of one-year postoperative. Efficacy outcomes included surgical success as well as the postoperative change in intraocular pressure (IOP) and glaucoma medication use at the last postoperative follow-up visit. Safety included best-corrected visual acuity (BCVA), cup-to-disc ratio (CDR), visual field mean deviation (VF-MD), retinal nerve fiber layer (RNFL) thickness, and adverse events.

Results: A total of 106 eyes of 88 patients were included in the study with an average follow-up (FU) duration of 18.0 ± 7.5 months (range [12–47] months). At FU, IOP decreased by 25% from 18.9 ± 5.3 mmHg preoperatively to 14.2 ± 3.4 mmHg ($p < 0.001$), and mean medication use reduced by 17% from 2.3 ± 1.3 medications to 1.9 ± 1.3 ($p < 0.001$). The surgical success rate was 93% as 7 eyes underwent a subsequent glaucoma surgery due to inadequate IOP control or evidence of disease progression. At FU, the postoperative improvement in BCVA was preserved ($p < 0.001$), and CDR, VF-MD, and RNFL thickness remained stable. Favorable safety included no intraoperative complications and few, transient, postoperative adverse events.

Conclusion: The real-world data from this multi-center Canadian study supports the high surgical success and efficacy of KDB goniotomy combined with cataract surgery in reducing IOP and glaucoma medication use, while also highlighting its favorable safety including stable BCVA, visual field, and RNF thickness.

P4.67
Efficacy of micropulse laser trabeculoplasty in Asian patients: results at 6-9 months

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Purpose: To report the efficacy of Micropulse Laser Trabeculoplasty (MLT) in Asian patients.

Methods: Patients with ocular hypertension (OHT) or open angle glaucoma (OAG) undergoing MLT over a 12-month period between July 2020 and July 2021 at a single eye unit in Malaysia (International Specialist Eye Centre, Kuala Lumpur) were included in this retrospective study. Patients with a prior history of laser trabeculoplasty or glaucoma surgery were excluded. MLT was performed in a 360 degree fashion with the IQ 577nm™ yellow laser (Iridex Corp, Mountain View, CA, USA) following instillation of proparacaine and brimonidine 0.1%. Laser settings were 1000mw, 15% duty cycle, 300 millisecond duration and 300 µm spot size. Patients were seen at week 1, weeks 4-6 and between 6-9 months. Treatment success was defined as IOP reduction ≥ 20% or ≥ 3 mmHg from baseline. Statistical analysis was performed using JASP v.0.16 (JASP Team 2021).

Results: 66 eyes of 43 patients were included in this study. Mean age was 60.5 (± 12.7) years, with a 1:1 male to female ratio. 72.9% of patients were Chinese, with Japanese (14.0%), South Indian (11.6%) and South Korean (2.3%) patients also included. Mean baseline IOP was 22.1 mmHg with a mean of 2.00 glaucoma drops -43-laser. At 1 week, there was a mean IOP reduction of 23.7% from baseline ($n = 53$, $p < 0.001$). IOP reduction at 4-6 weeks was 23.1% ($n = 54$, $p < 0.001$) and 26.9% at 6-9 months ($n = 44$, $p < 0.001$). No IOP spikes were noted within the first month. 39 of 66 (59.1%) eyes achieved a reduction in IOP ≥ 20% or ≥ 3 mmHg from baseline at 6-9 months. Mean glaucoma drops reduced from 1.97 at baseline to 1.64 at 6-9 months ($p = 0.002$). 10 of 66 (15.2%) eyes required further glaucoma surgical intervention. 12 eyes were lost to follow up.

Conclusion: MLT is effective in reducing IOP and number of glaucoma drops in Asian patients with OHT or OAG. IOP reduction is noticeable as early as week 1 post laser and appears to be sustained at 6-9 months. Our results are comparable with previous published data in a similar patient population.

P4.68
Efficacy and outcomes of Nd:YAG laser goniopuncture after nonpenetrating deep sclerectomy

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Purpose: To report the efficacy and safety of Neodymium:Yttrium Aluminum Garnet (Nd:YAG) laser goniopuncture (LGP) in lowering intraocular pressure (IOP) after nonpenetrating deep sclerectomy (NPDS).

Methods: This retrospective cohort study includes 21 eyes of 20 patients who underwent LGP between January 2016 and December 2018. The minimum follow-up time was 24 months. Prior to LGP, patients had undergone NPDS with mitomycin C and an Esnoper implant. Demographic variables, type of glaucoma, intraocular pressure (IOP), LGP procedure and post-LGP complications were analyzed.

Results: Mean IOP was 22.0 mmHg prior to LGP, and 12.1, 14.7, 13.2 at 1, 6 and 24 months after LGP, respectively. Post-laser IOP was significantly lower than pre-laser IOP at every time point. Mean time between NPDS and need for LGP was 9 months (ranging from 1 week and 48 weeks). It was necessary to repeat LGP in 4 eyes due to insufficient IOP decrease, one week after the initial procedure. At 24 months, 8 eyes were given topical anti-glaucomatous medications due to inadequate IOP control after LGP. Complications following Nd:YAG LGP occurred in 3 eyes (Iris prolapse into the trabeculo-descemetic window occurred in 2 eyes, and choroidal detachment in one eye)

Conclusion: LGP is a safe and effective treatment that makes it possible to further lower IOP after NPDS in many cases avoiding the need to add topical medications or performing additional filtering surgery.

P4.69
Outcomes of filtering surgery with collagen matrix implant (Ologen®) and mitomycin C (MMC) versus MMC alone

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Purpose: To compare the hypotensive efficacy and the reduction of IOP-lowering medications associated with the use of MMC 0.02% versus MMC 0.02% plus Ologen® in filtering surgery.

Methods: Retrospective, comparative study, in which 179 eyes with glaucoma were included. Trabeculectomy was performed in 32%, non-perforating deep sclerectomy (NPDS) in 43.5%, and ExPress implant in 23.7%. In all of them, MMC was applied at 0.02% for 2 minutes and in 41.9% of the cases, Ologen®

was also associated. Complete success was defined as IOP < 20 mmHg and IOP reduction of at least 20% without IOP-lowering medications.

Results: The mean follow-up was 12 months. Combined cataract and glaucoma surgery was performed in 64.8% of the cases. Mean IOP reduction was significantly greater in the Ologen® group at 1 week (p = 0.006), month 1 (p < 0.001), month 3 (p < 0.001), and month 6 (p = 0.014), without differences at month 12 (p = 0.14). IOP was reduced from a mean of 20.04+5.9 to 14.2+1.4 mmHg at month 12 in MMC plus Ologen® group, and from a mean of 23.6+7.3 to 14.7+3.02 mmHg at month 12 in MMC group. The number of IOP-lowering medications per eye was reduced from a mean of 3.19 preoperatively to 0.25 in MMC plus Ologen® group at month 12 and from a mean of 2.77 preoperatively to 0.77 in the MMC group (p = 0.019). The complete success rate was significantly higher in eyes that received Ologen®, although, overall (Success yes/no), there were no significant differences. The proportion of eyes achieving a target IOP ≤ 16 mmHg without IOP-lowering medications was significantly higher in the MMC plus Ologen® group. Preoperative IOP and the use of Ologen® were associated with a higher probability of success, both in the univariate analysis and in the multivariate analysis.

Conclusion: The use of MMC 0.02% plus Ologen® is associated with a greater reduction in IOP-lowering medications, a higher rate of complete success and a greater proportion of patients with IOP < 16 mmHg.

P4.71
XEN ab externo and ab interno: comparison of safety and efficacy between both approaches

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Purpose: To compare safety and efficacy in intraocular pressure (IOP) management between XEN ab interno and XEN ab externo. Previous studies are scarce and showed no differences in efficacy and safety between both approaches.

Methods: A retrospective analysis was performed comparing the first 13 XEN®45 Gel Stent (Allergan Inc., CA, USA) ab externo implanted with the first 13 using ab interno approach implanted in our hospital. Primary outcomes included mean IOP at 3 months, 6 months, intraoperative and postoperative complications. Secondary outcomes included the mean number of required hypotensive drugs postoperatively.

Results: As seen in table 1, both groups had similar baseline characteristics. Mean follow-up time was significantly lower in XEN ab externo than in XEN ab interno, as the first approach is a more recent technique performed in our hospital.

Mean age (years old)	77.1	81.4
Types of glaucoma	POAG 11 (84.6%) PEXG 2 (15.4%)	POAG 10 (76.9%) NTG 1 (7.7%) PEXG 1 (7.7%) PCAG 1 (7.7%)
Previous glaucoma surgery	3 / 13 (23.1%)	1 / 13 (7.7%)
Mean IOP previous to XEN implant (in mmHg)	22.9	20.1
Mean number of hypotensive topical drugs	2	1.8
Mean follow-up (days)	317	2085

Mean IOP at 3 months was 15.4 mmHg and 13.7 mmHg in XEN ab interno and XEN ab externo respectively, with no statistical significance. Mean IOP at 6 months was 17.7 mmHg and 13 mmHg in XEN ab interno and XEN ab externo respectively with statistical significance (T-student, p = 0.035). Mean use of postoperative hypotensive drugs to maintain target IOP at 6 months was higher in XEN ab interno with no statistical significance though. Although transient hypotony was found in both groups, no cases of hypotonic maculopathy nor choroidal detachments were registered.

Conclusion: Our preliminary results suggest that XEN ab externo may be more effective in achieving target IOP than XEN ab interno. Moreover, both approaches have similar safety profile. However, there is a need to confirm these preliminary data increasing the follow-up time and the number of performed XEN.

P4.72
Long term surgical results of nonpenetrating deep sclerectomy using the Ologen implant vs. the Esnoper V2000 implant

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Purpose: To compare the long term results of non-penetrating deep sclerectomy (NPSS) using Esnoper V2000 vs. Ologen.

Methods: We included all the NPSS performed in our center since 2011 with a follow-up of at least 2 years. Exclusion criteria were: combined surgeries with phacoemulsification and patients previously operated on glaucoma surgery. In all surgeries MMC 0.02% was used for 2 minutes. The Esnoper V2000 implant was placed in the suprachoroidal space. The Ologen was placed subtenon and underneath the superficial scleral flap. The main variables were the intraocular pressure (IOP), visual acuity (VA) and number of drugs. Other variables were collected, including epidemiological data, goniopunctures, bleb needlings and surgical revisions.

Results: A total of 204 eyes from 178 patients were recruited, 119 (58.3%) were men and the mean age was 69.8 years old. The most frequent etiology for NPSS performance was primary open angle glaucoma. 2 groups were created regarding the implant used: Ologen (n = 65) and suprachoroidal Esnoper (n = 139). The mean IOP before surgery was 24.5 mmHg in the Ologen group and 23.15 mmHg in the Esnoper group, with no statistical differences. Regarding the IOP at 24 hours, there were no differences either, being 6.43 and 7.73 respectively. IOP reduction at 2 years was 11.54 mmHg (p < 0.001) in the Ologen group and 8.51 mmHg (p < 0.001) in the suprachoroidal

Esnoper group, this difference being significant. The Ologen group presented a reduction in the need of hypotensive drugs of 2.72 ($p < 0.001$) and the Esnoper group of 2.34 ($p < 0.001$). No statistical differences were observed in the reduction of the VA. During the follow up, the Ologen group required less goniopunctures, bleb needlings and surgical revisions compared to the Esnoper group (45% vs. 52.71%; 4.83% vs. 23.25%; 10.40% vs. 12.40% respectively).

Conclusion: In our series, both types of implants show effectiveness in lowering IOP and reducing the number of drugs after a follow-up of 2 years. The EPNP with implantation of Ologen presents a better IOP reduction.

P4.73
Intraocular pressure outcomes and failure risk factors of non penetrating deep sclerectomy: the AGORA registry study

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Purpose: To analyse intraocular pressure (IOP) outcomes and risk factors of failure of non-penetrating deep sclerectomy (NPDS)
Methods: The AGORA study is a monocentre observational registry study performed at Bordeaux University Hospital. Open angle glaucoma patients with visual field progression undergoing a non-penetrating deep sclerectomy were consecutively included. All patients had systematic collection of preoperative and operative data and had postoperative visits at day-3, day-15, day-30, day 60, day 90 and at 6 months and every 6 months. Intraocular pressure was measured using Goldmann applanation tonometry and complications as well as secondary procedures were systematically collected. A mixt logistic regression model was used and a multiple imputation methods were applied for missing data.

Results: In this intermediate analysis, 376 eyes of 263 patients were included. The mean preoperative IOP was 21.0 ± 6.8 mmHg, the mean number of hypotensive medications was 2.2 ± 0.9, the mean preoperative deviation value of the visual field was -10.07 ± 8.8dB. Mean postoperative IOP was 13.5 ± 5.6 mmHg at 6 months, 13.7 ± 4.3 mmHg at 12 months and 14.1 ± 4.5 mmHg at 36 months. The cumulative incidence of goniopuncture was 46% (n = 162) at 36 months. Time interval from surgery was significantly associated with failure (Yearly Odd-Ratio (OR): 1.7, (95%Confidence Interval (CI):1.4;1.9), $p < 0.001$) as well as non-caucasian ethnicity (OR : 3.3 (95%CI:1.6;7.0), $p < 0.001$), needling procedures (OR : 3.8 (95%CI:2.1;6.7), $p < 0.001$) and the number of preoperative medications (OR: 1.7 (95%CI:1.1;1.9), $p < 0.05$. Combined cataract surgery and glaucoma type were not associated with failure.

Conclusion: NPDS is associated with a significant reduction in IOP during the follow-up and a low rate of complications in open angle glaucoma patients. Preoperatively, non-caucasian ethnicity and the number of topical medications were independent risk of postoperative failure. In the context of minimally invasive glaucoma surgery procedures, NPSD filtering surgery remains a surgical standard of care for progressing glaucoma.

P4.74
Prospective evaluation of micropulse diode transscleral cyclophotocoagulation in uncontrolled glaucoma patients: a case series

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Purpose: To evaluate the intermediate-term effectiveness, measured as intraocular pressure reduction, and safety of micropulse diode transscleral cyclophotocoagulation in uncontrolled glaucoma, and to determine in which glaucoma type is more effective.

Methods: We prospectively evaluated a case series of 21 eyes of 19 patients with refractory and terminal glaucoma, treated with micropulse transscleral diode cyclophotocoagulation between 2019 and 2020 in Hospital Universitari Vall d'Hebrón. Intraocular pressure, side effects, visual acuity and number of glaucoma medications were monitored before laser treatment until 3 months after.

Results: Mean age was 70 years and 13 (62%) patients were female. All patients showed low corrected distance visual acuity (count fingers or worse) and primary open angle glaucoma was the most common diagnosis. Mean prelaser intraocular pressure was concentrated between 26-35 mmHg. This was reduced to <20-25 mmhg at both 1 and 3 months post-laser. In neovascular glaucoma patients, mean prelaser intraocular pressure was higher (52 mmHg) but we observed a higher reduction of intraocular pressure after cyclophotocoagulation compared to other glaucoma types (mean reduction of 23 mmHg at 1 month and 18 mmHg at 3 months post-laser in neovascular glaucoma, and of 3.5 mmHg at both 1 and 3 months in primary open angle glaucoma patients). The mean number of antiglaucoma drops was 3 at baseline, alone or combined with oral acetazolamide. At 3 months post-laser, oral acetazolamide could be stopped in 4 of 6 patients and no side effects were observed. Five patients (24%) required new cyclophotocoagulation treatment and one patient died so no data were obtained.

Conclusion: Micropulse diode transscleral cyclophotocoagulation is a safe and effective non invasive glaucoma laser treatment in refractory and advanced glaucoma, and can reduce the need for ocular antihypertensive medication in several patients, especially oral antiglaucoma treatments. In our study, neovascular glaucoma patients benefited the most from micropulse diode transscleral cyclophotocoagulation.

P4.75
Registry study of two trabecular micro-bypass iStents© implantation combined with cataract surgery in various glaucoma types and severities: long-term real-life outcomes

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Purpose: To assess the long-term efficacy and safety of two trabecular micro-bypass iStents° implantation with concomitant cataract surgery in real-life setting.

Methods: Registry study performed at Bordeaux University Hospital including patients with various subtypes and severities of glaucoma, who underwent phacoemulsification followed by ab interno implantation of 2 iStents° between November 2010 and December 2017. Postoperatively, subjects were assessed on days 3, 15, months 1, 3, 6, and then every 6 months for a period of 4 years follow-up. IOP, number of medications and complications were assessed at each visit. Association of baseline characteristics with failure of the procedure was evaluated in a multivariate analysis.

Results: 138 eyes of 91 subjects were included in the analysis. Mean follow-up was 31.8 ± 16.2 months. Mean baseline IOP was 18.01 ± 5.39 mmHg with a mean number of 2.3 ± 1.1 hypotensive medications. The mean IOP reduction was 22.2% at 1 year and that reduction was stable over time (22.5% IOP reduction at 3 years). The medication burden was reduced by 61% with a mean reduction of 1.4 medications at the end of the follow-up. 52% (n = 50) of eyes were medication-free à 3 years. 59.4% of eyes at 1 year and 53.9% at 3 years achieved an IOP reduction of ≥ 20% from baseline or an IOP ≤ 18 mmHg with a reduction of at least 1 medication. There were no serious adverse events related to the device; frequently reported events included transient IOP spikes, 5 eyes required additional glaucoma surgery. Male gender, thinner RNFL and decreased ACD were significantly associated with failure of the procedure.

Conclusion: MIGS procedures have an increasingly role in the glaucoma treatment algorithm. The majority of eyes had a significant reduction in IOP and topical medication burden compared to baseline with an overall high safety profile reported. Multivariate analysis underlines that the combined surgery, and more generally trabecular ab interno minimally invasive glaucoma surgeries, area not as effective in all glaucoma and target patient profile must be clearly identified. Registry studies are powerful emerging tools complementary to randomized controlled trials providing data on unselected population, with a strong correlation with real-life clinical practice.

P4.76
Choice of anaesthetic technique for trabeculectomy surgery and analysis of post-operative outcomes

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Purpose: To evaluate anaesthetic choices for trabeculectomy surgery and its post-operative outcomes.

Methods: Patients who underwent trabeculectomy surgery (TS) in a single tertiary referral centre in London (King's College Hospital) were identified using electronic medical records (Medisoft). All surgeries were performed by a glaucoma consultant or fellow in a standard ophthalmic operating room with anaesthetic consultant cover. Data on basic demographics, anaesthetic type, visual acuity (VA), intraocular pressure (IOP), number of glaucoma medications and postoperative complications were collected retrospectively and analysed using Kruskal-Wallis and X^2 statistical analysis (RStudio version 2021.09.1).

Results: 729 TS were performed between September 2006 and February 2022. 26% were performed under general anaesthesia (GA) (Group 1, n = 188), 67% with peribulbar anaesthesia (Group 2, n = 490), and 7% with subtenon's anaesthesia (Group 3, n = 51). The mean age (years) of patients was 56.4 (range 22-88), 69.7 (range 29-94) and 69.9 (range 39-89) for Groups 1, 2 and 3 respectively. Group 1 accounted for 46% (n = 99) of TS performed between years 2006 and 2010 and reduced to 12% (n = 32) between years 2017 and 2021. Preoperative IOP (± SD in mmHg) was 23.93 (± 7.39), 22.18 (± 6.97) and 23.58 (± 7.00) in Groups 1, 2 and 3, respectively (p = 0.254). The %IOP reduction from baseline at the last clinic visit was similar in all groups; 32%, 32% and 37% in Groups 1, 2 and 3 respectively (p = 0.418). Mean duration of follow up was 25.4 months (range: 1-110). At 5-years post-trabeculectomy, 49% (n = 64), 36% (n = 85) and 41% (n = 12) required no IOP-lowering medication in Groups 1, 2 and 3, respectively (p = 0.168). The most common early postoperative complications recorded were bleb leak 4.4% (n = 32), hypotony (numerical and clinical) 5.2% (n = 38) and hyphema 0.5% (n = 4).

Conclusion: Our findings showed a reduction in the number of TS performed under GA and an increase in use of local anaesthetic over the last decade. Overall, the choice of anaesthetic technique had no bearing on the outcome of TS, with comparable IOP reductions and long-term success rates.

P4.77
Effect of the Prolene stent suture on the Baerveldt tube tip position

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Purpose: To report the variation in Baerveldt tube (BVT) tip position before, during, and after Prolene stent suture (PSS) removal and to demonstrate the influence of straight vs curved segments of the PSS on the BVT tip position.

Methods: We report two patient cases of BVT stented with 3/0 PSS and the tube tip position before, during and after PSS removal demonstrated by Anterior Segment OCT images and intraoperative video footage. Ex vivo experiments showing the effect of inserting straight vs curved segments of 3/0, 4/0 and 5/0 PSS on the BVT tip position are also presented.
Results: Case A demonstrates the minimum BVT tip- endothelial distance (Fig. 1) increasing by 30% after 3/0 PSS removal (Fig. 2). Case B demonstrates the BVT-endothelial distance transiently reducing intra-operatively with almost endothelial touch during 3/0 PSS removal (video footage). Ex vivo experiments using different gauges of PSS (3/0, 4/0 and 5/0) all demonstrate rotation of the BVT tip, which conforms to the curvature of the PSS segment (Figgs. 3 and 4) whereas no difference is noted when inserting a straight PSS segment of any gauge.

Conclusion: The rigid nature of the PSS may influence the silicone BVT tube tip position in the anterior chamber, which may be minimised by selecting a straight PSS segment to stent the BVT. In contrast, a curved PSS segment may be useful in repositioning the BVT tip posteriorly in cases of reduced tube-corneal distance, potentially avoiding a surgical revision. Since the smallest gauge (5/0) of PSS was able to alter the BVT tip curvature (Figure 4), a curved 5/0 PSS may be inserted into the BVT ab interno through a paracentesis to achieve tip rotation away from the corneal endothelium, without flow restriction. This small case series warrants further study to consolidate these findings.

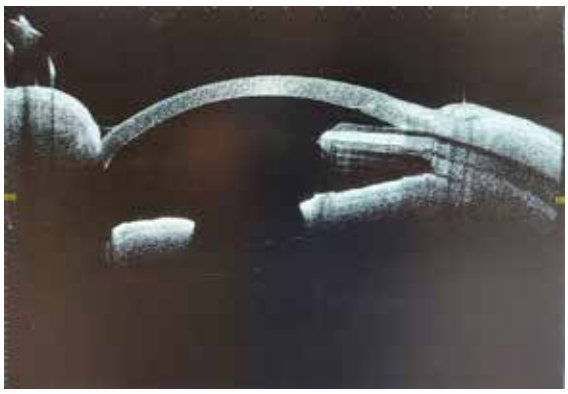

Figure 1. BVT tip position with 3/0 PSS in situ.

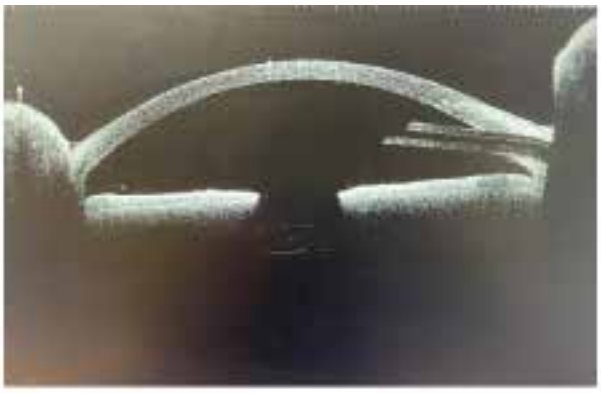

Figure 2. BVT tip position after removal of PSS.

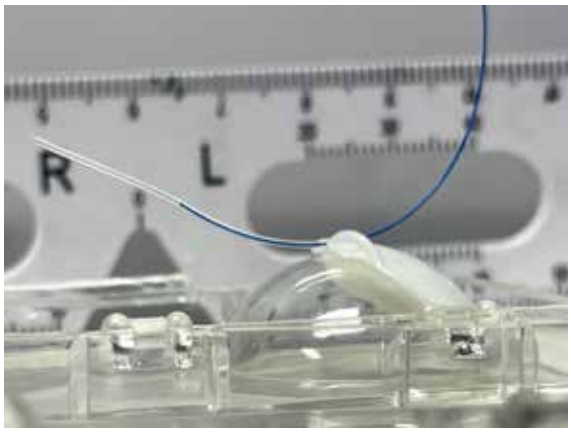

Figure 3. BVT tip profile on insertion of a curved PSS segment.

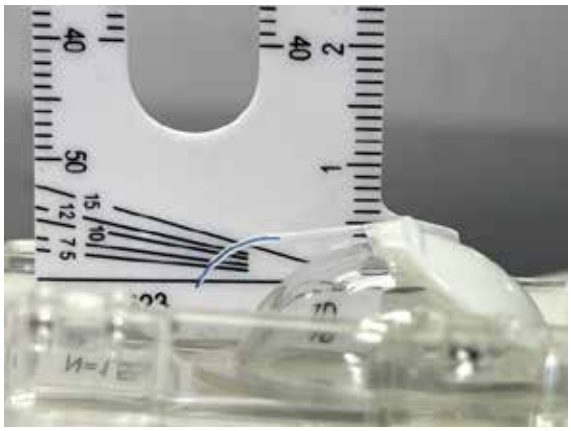

Figure 4. Ex-vivo example of ab interno curved PSS insertion on BVT tip profile.

P4.78
Early results of PreserFlo microshunt to control intraocular pressure in eyes with previous failed trabeculectomy

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Purpose: To assess the efficacy and safety of the PreserFlo microshunt in eyes with previous failed trabeculectomy.

Methods: Retrospective consecutive case series. Patients with previous failed trabeculectomy who underwent ipsilateral Preserflo microshunt implantation (PM) between January 2020 and February 2022 in a single tertiary referral centre in London (King's College Hospital) were recruited. Basic demographic data, type of glaucoma, time between trabeculectomy and PM (TTM), visual acuity (VA), intraocular pressure (IOP), number of glaucoma medications (NM) and complications were analysed. Success was defined as 20% reduction in IOP from baseline, 5 < IOP < 18mmHg with (qualified) and without (complete) IOP lowering drops at the final follow up (FF) without further surgery. Statistical analysis was done using T-test, Fisher Exact test and Pearson Correlation Coefficient.

Results: Nineteen eyes of eighteen patients were recruited. The ethnic origin was 26% Caucasian (n = 5), 63% African-Caribbean (n= 12) and 11% others (n = 2). The mean (±SD) age was 64 (±12) and TTM was 82 (±42) months. The mean duration (±SD) of FF was 11 (±6) months. The VA at time of listing (TOL) and FF was 0.43 (±0.50) LogMAR and 0.47 (±1.00) LogMAR (p = 0.8769). The mean (±SD) IOP (mmHg) at TOL, day 1, week 1 (W1), month 1, month 3, month 6 and month 12 was 22 (±5), 6.2 (±2.4), 9.6 (±5.8), 11.0 (±4.4), 11.5 (±6), 13 (±7.3) and 13 (±4.7) respectively. There was 45% reduction in IOP from TOL to FF (p < 0.0001). Overall success at FF was 74% (n = 14) which increased to 84% (n = 16) after bleb needling. Complete success was seen in 100% of Caucasian patients (n = 5) and 42% Afro-Caribbean patients (ACP) (n = 5) while qualified success achieved in 67% of ACP (n = 8) (p = 0.2308). Early hypotony (IOP < 5 mmHg) was noted in 53% (n = 10), of which, 50% (n = 5) was numerical hypotony and four patients (40%) required intervention. NM reduced from 3.7 (±1.5) at TOL to 0.8 (±1.5) at FF (p < 0.0001). The FF IOP was positively correlated to IOP at W1 (95% confidence interval, R2 = 0.2357, p = 0.035315).

Conclusion: Our results demonstrate that the Preserflo microshunt can be an effective treatment following failed trabeculectomy surgery. Early hypotony was observed in our cohort, although the majority did not require intervention. Early postop IOP showed a weak correlation with final IOP.

P4.79
Surgical outcomes of phacoemulsification combined with iStent considering ethnic background, at a tertiary referral hospital

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Purpose: To evaluate the outcomes of combined phacoemulsification and iStent in a large cohort of patients, analysing differences between Caucasian(CP) and African-Caribbean patients(ACP).

Methods: 650 patients(827 eyes) underwent combined phacoemulsification and iStent(CPI) in a tertiary referral centre in London (King's College Hospital) between September 2017 and February 2022. Data on basic demographics, visual acuity(VA), intraocular pressure(IOP) and surgical complications were analysed retrospectively. Statistical analysis was performed using T-Test and Chi-squared test.

Results: The ethnic origin was 43% CP (n = 354), 27% ACP (n = 226), 23% not-specified (n = 192) and 7% other background (n = 55). The mean (± SD) age was 74 (±10). The mean duration of follow up was 34 (±15)months. The mean (±SD) preoperative IOP (mmHg) was 19 (±6). The mean (±SD) postoperative IOP was significantly reduced at Year 1, Year 2 and at the final clinic visit and measured 15 (±5), 16 (±6) and 15 (±5) respectively ($p < 0.001$). At the end of follow-up, 44.84% of eyes achieved > 20% reduction in IOP in the ACP group, as compared with 57.06% in the CP group ($p=0.008$). Average (±SD) pre-operative VA was 0.465 (±0.503) logMAR and at the last clinic visit was 0.285 (±0.507) logMAR, representing a mean VA gain of 39% ($p < 0.0001$) in all patients. 16 eyes required incisional surgery. Mean duration from iStent and phacoemulsification to incisional surgery was 21 (±10) months. Surgical complications were noted in 2.54% of the CP, compared with 6.2% of the ACP. No cases of endophthalmitis were reported in this cohort.

Conclusion: IStent implantation combined with phacoemulsification demonstrated an overall reduction in IOP in this large cohort in both CP and ACP. In the ACP group the percentage of eyes achieving more than 20% reduction in IOP was lower than in the CP group. Further studies are needed to determine the correlation of ethnicity with surgical outcomes.

P4.80
ive-year outcomes of XEN gel stent surgery in patients with open-angle glaucoma

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Purpose: To evaluate 5-year treatment outcomes of XEN gel stent implantation in patients with open angle glaucoma.

Methods: In this prospective, single-centre interventional study, XEN implantation either alone or combined with phacoemulsification (Phaco + XEN) was performed on consecutive eyes with uncontrolled intraocular pressure (IOP) or disease progression despite medical treatment.

Results: Out of 170 eyes initially included, 80 eyes (53.7%) of 68 patients completed the 5-year follow-up and were included in the data (XEN: n = 17; Phaco + XEN: n = 63) after 46.3% were lost to follow-up. Mean age was 78.1 ± 9.1 years, and 69.8% were female. Mean medicated IOP decreased from 19.8 ± 7.0 mmHg (19.9 ± 7.8 [XEN] vs. 20.1 ± 7.6 mmHg [Phaco + XEN]) at baseline to 12.6 ± 3.1 mmHg (12.6± 3.1 [XEN] vs. 12.7 ± 3.1 [Phaco + XEN]) at 5 years (±37.0%; $p < 0.001$). Medications decreased from 2.0 ± 1.3 (2.0 ± 1.3 [XEN] vs. 2.0 ± 1.3 [Phaco + XEN]) to 0.8 ± 0.5 (0.8 ± 1.1 [XEN] vs. 0.8 ± 1.1 [Phaco + XEN]) (±60%; $p < 0.001$). Needling revision was performed in 39 eyes (49%), and 19.4% underwent reoperations.

Conclusion: At 3 years, XEN gel stent implantation achieved clinically significant IOP and medication reduction. The procedure carries a substantial rate of needling and re-operations.

P4.81
A biomaterial drug-eluting device for reducing post-trabeculectomy inflammation and fibrosis

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Purpose: Drainage tube or trabeculectomy surgeries in late-stage glaucoma patients remain beset by unacceptably high failure rates due to post-operative inflammation and fibrosis. Therefore, we describe a proteoglycan (PG) -modified hyaluronic acid (HyA) hydrogel-Polycaprolactone (PCL) device that aims to address post-surgical inflammation and remove patient compliance issues (Figure 1A+B).

Methods: PG-HyA hydrogels were chemically crosslinked, freeze-dried and assessed for percentage crosslinking, swelling speed, degradation, and ease of insertion into cadaveric rabbit eyes. Following drug loading and 3D printing, prednisolone drug release over 12 weeks was assessed. Bioactivity of the released drug and the effect of proteoglycan were investigated in primary rabbit conjunctival fibroblast (RconF) cells stimulated with Transforming Growth Factor beta (TGF-B) (Fig. 1C). Finally, anti-angiogenic effect was evaluated in a chick embryo model of angiogenesis.

Results: Hydrogels were capable of rapid swelling with full hydration in < 30 min and stability up to 4 weeks minimum. Enzymatic degradation was also shown to be related to cross-linking efficacy. Release of prednisolone from mesh-gel composites was found to exhibit a biphasic release with an initial burst release over 72 hours and gradual release over 12 weeks. Release kinetics were found to be dependent on mesh dimensions. Sham surgeries found devices were easily implanted in the sub-conjunctival space. In vitro analysis using RconF cells demonstrated a significant reduction in collagen deposition compared to blank devices (Fig. 1D) at 1 week with decreases of up to 35% recoded vs positive controls. Furthermore, released drug was found to effectively inhibit angiogenesis up to 5 days in the chick embryo model.

Conclusion: From this work, a highly scalable and easily implanted device was created. The device demonstrated significant reductions in key markers of fibrosis, namely collagen

deposition and angiogenesis. Current work is focussed on an ongoing in-vivo pilot study in post-trabeculectomy rabbits.

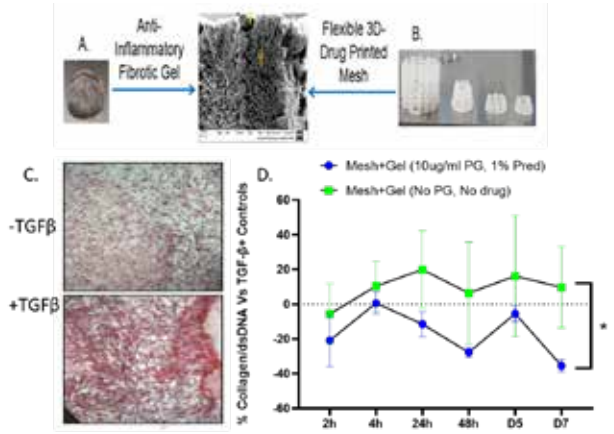

Figure 1. Gel mesh composite A) PG-HyA outer gel and B) internal 3D-printed, drug-loaded mesh. C) RconF cells were stimulated to model fibrosis using 5 ng/ml TGF-Ð. D) When drug-release samples were applied Rconf cells, significant reductions were seen vs blank devices with collagen decreasing by up to 35%.

P4.82
Magnetic resonance imaging of glaucoma drainage devices

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Purpose: Filtering blebs from glaucoma drainage devices (GDD) form too posteriorly for direct observation. The purpose of this study was to evaluate magnetic resonance imaging (MRI) features of different GDD and explore clinical correlations.

Methods: Cross-sectional study of ocular, GDD and bleb morphology using 3-Tesla MRI in consecutive patients implanted with one of 4 distinct GDD: Ahmed Glaucoma Valve FP7 (AGV), Ahmed ClearPath 350mm^2 (ACP; New World Medical, USA), Baerveldt Glaucoma Implant 350mm^2 (BGI; Abbott Medical Optics, USA) and Paul Glaucoma Implant (PGI; Advanced Ophthalmic Innovations, Singapore). Clinical data was retrieved from patient files. Statistical analysis was performed with Prism 8 (GraphPad Software, San Diego, CA).

Results: A total of 36 eyes from 30 patients aged 57 ± 20 years (mean ± SD) were included in this study. Seven eyes had been implanted with AGV (19%), 8 with ACP (22%), 5 with BGI (14%) and 16 with PGI (44%). Orbital MRI was performed 2.4 ± 2.1 months after surgery. Total bleb volume was 563 ± 390 mm^3, with no significant difference among different GDD (p = 0.1223). Bleb volume did not correlate with intraocular pressure (IOP) at any timepoint (pre-operative, time of MRI, last follow-up; p > 0.1524, all comparisons) or with time from surgery to MRI (p = 0.5590). A double-layered bleb was observed in 94% of eyes (n = 34), the layers separated by the GDD endplate. Inferior blebs (between the sclera and the endplate undersurface) were significantly larger with the PGI than with the remaining GDD (380 ± 205 vs. 193 ± 161 mm^3; p = 0.0043) and larger with non-valved GDD (BGI, PGI and ACP, collectively) versus AGV (318 ± 202 vs. 101 ± 64 mm^3; p = 0.0086). Flattening of the scleral bed underneath the endplate was commonly observed in eyes with non-valved GDD (n = 15; 52%) but absent in all AGV patients, and was associated with larger blebs (present in 78% of blebs in volume quartile 75-100; p = 0.0049).

Conclusion: Double-layered blebs are a common finding with GDD filtering blebs. Bleb morphology seems to be independent of IOP or time from surgery, but dependent on the type of GDD, with non-valved devices (particularly the PGI) forming larger inferior blebs which commonly flatten the underlying sclera.

This work has been submitted to the ARVO 2022 meeting.

Ωφελέειν ή Μη Βλάπτειν

Bring benefit, not harm

Hippocrates